

DUPLICATE

TOWN OF ARLINGTON

TOWN CLERK

Date August 30, 20 21

Rec'd from 2-14 Medford Street, LLC

Address 455 Massachusetts Avenue, Suite 1
Arlington, MA 02474

By jaw

		AMOUNT	
	Certificate		
	Marriage Int.		
	Fin. Statement		
	Pole Location		
	Garage Renewal		
	Misc. Books		
	Sporting Licenses		
	Dup. Dog Tags		
	Dog Licenses		
	Citation #		
<u>1</u>	Misc. Licenses / Permits <u>EDR</u>	<u>4,510.</u>	<u>00</u>

Leader Bank check #1222

29956

RV PRINT SOLUTIONS 603-580-4687 33268277

LB 1/17

Docket 3673



TOWN OF ARLINGTON
REDEVELOPMENT BOARD

Application for Special Permit In Accordance with Environmental Design
Review Procedures (Section 3.4 of the Zoning Bylaw)

PLANNING & COMMUNITY
DEVELOPMENT

2021 AUG 27 AM 11:06

Docket No. 3673

1. Property Address 455-457 Massachusetts Avenue & 2-14 Medford Street
Name of Record Owner(s) 2-14 Medford Street, LLC Phone 781-654-6306
Address of Owner 455 Massachusetts Avenue, Ste 1, Arlington, MA 02474
Street City, State, Zip
2. Name of Applicant(s) (if different than above) Same as above
Address _____ Phone _____
Status Relative to Property (occupant, purchaser, etc.) _____
3. Location of Property Map 45, Lots 4-5.a
Assessor's Block Plan, Block, Lot No.
4. Deed recorded in the Registry of deeds, Book _____, Page _____;
-or- registered in Land Registration Office, Cert. No. 7802C, in Book 1523, Page 99
5. Present Use of Property (include # of dwelling units, if any) Retail, Service, Restaurant
6. Proposed Use of Property (include # of dwelling units, if any) Mixed-Use
Apartment Units & Retail,
Service, Restaurant
7. Permit applied for in accordance with _____ See Exhibit "A" attached
the following Zoning Bylaw section(s) _____
_____ section(s) title(s)

8. Please attach a statement that describes your project and provide any additional information that may aid the ARB in understanding the permits you request. Include any reasons that you feel you should be granted the requested permission.
See attached

RECEIVED

2021 AUG 30 AM 12:55

TOWN CLERK'S OFFICE
ARLINGTON, MA 02174

(In the statement below, strike out the words that do not apply)
The applicant states that 2-14 Medford Street, LLC is the owner -or- occupant -or- purchaser under agreement of the property in Arlington located at 455-457 Massachusetts Avenue & 2-14 Medford Street which is the subject of this application; and that unfavorable action -or- no unfavorable action has been taken by the Zoning Board of Appeals on a similar application regarding this property within the last two years. The applicant expressly agrees to comply with any and all conditions and qualifications imposed upon this permission, either by the Zoning Bylaw or by the Redevelopment Board, should the permit be granted.

Signature of Applicant(s)

1171 Massachusetts Avenue, Arlington, MA 02476 781-646-4911

Address

Phone

**Exhibit A to Application for Special Permit
in Accordance with Environmental Design Review**

455-457 Massachusetts Avenue

Arlington, MA

7. Permit applied for in accordance with the following Zoning Bylaw section(s):
- 3.4 Environmental Design Review
 - 5.5.2 Dimensional and Density Regulations
 - SP (Mixed Use $\leq 20,000$ SF)
 - 6.12.5 Parking Reduction in a Business Zone
 - 6.1.11 Parking Standards
 - 5.3.21 Screening and Buffer Requirements
 - 5.3.16 Setback Requirements
 - 5.3.19 Reduced Height Buffer Area
 - 5.3.8 Corner Lot Requirements
 - 5.2.4 Multiple Principal Uses



Town of Arlington Redevelopment Board
Application for Special Permit in accordance with
Environmental Design Review (Section 3.4)

Required Submittals Checklist

Two full sets of materials and one electronic copy are required. A model may be requested. Review the ARB's Rules and Regulations, which can be found at arlingtonma.gov/arb, for the full list of required submittals.

- ☒ Dimensional and Parking Information Form (see attached)
- ☒ Site plan of proposal
- ☐ Model, if required
- ☒ Drawing of existing conditions
- ☒ Drawing of proposed structure
- ☒ Proposed landscaping. May be incorporated into site plan
- ☒ Photographs
- ☒ Impact statement
- ☐ Application and plans for sign permits
- ☒ Stormwater management plan (for stormwater management during construction for projects with new construction)

FOR OFFICE USE ONLY

_____ Special Permit Granted	Date: _____
_____ Received evidence of filing with Registry of Deeds	Date: _____
_____ Notified Building Inspector of Special Permit filing	Date: _____

TOWN OF ARLINGTON
REDEVELOPMENT BOARD

Petition for Special Permit under Environmental Design Review (see Section 3.4 of the
Arlington Zoning Bylaw for Applicability)

For projects subject to Environmental Design Review, (see Section 3.4), please submit a statement that completely describes your proposal, and addresses each of the following standards.

1. Preservation of Landscape. The landscape shall be preserved in its natural state, insofar as practicable, by minimizing tree and soil removal, and any grade changes shall be in keeping with the general appearance of neighboring developed areas.
2. Relation of Buildings to Environment. Proposed development shall be related harmoniously to the terrain and to the use, scale, and architecture of existing buildings in the vicinity that have functional or visual relationship to the proposed buildings. The Arlington Redevelopment Board may require a modification in massing to reduce the effect of shadows on abutting property in an R0, R1 or R2 district or on public open space.
3. Open Space. All open space (landscaped and usable) shall be so designed as to add to the visual amenities of the vicinity by maximizing its visibility for persons passing the site or overlooking it from nearby properties. The location and configuration of usable open space shall be so designed as to encourage social interaction, maximize its utility, and facilitate maintenance.
4. Circulation. With respect to vehicular, pedestrian and bicycle circulation, including entrances, ramps, walkways, drives, and parking, special attention shall be given to location and number of access points to the public streets (especially in relation to existing traffic controls and mass transit facilities), width of interior drives and access points, general interior circulation, separation of pedestrian and vehicular traffic, access to community facilities, and arrangement of vehicle parking and bicycle parking areas, including bicycle parking spaces required by Section 8.13 that are safe and convenient and, insofar as practicable, do not detract from the use and enjoyment of proposed buildings and structures and the neighboring properties.
5. Surface Water Drainage. Special attention shall be given to proper site surface drainage so that removal of surface waters will not adversely affect neighboring properties or the public storm drainage system. Available Best Management Practices for the site should be employed, and include site planning to minimize impervious surface and reduce clearing and re-grading. Best Management Practices may include erosion control and storm water treatment by means of swales, filters, plantings, roof gardens, native vegetation, and leaching catch basins. Storm water should be treated at least minimally on the development site; that which cannot be handled on site shall be removed from all roofs, canopies, paved and pooling areas and carried away in an underground drainage system. Surface water in all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian traffic, and will not create puddles in the paved areas.

In accordance with Section 3.3.4, the Board may require from any applicant, after consultation with the Director of Public Works, security satisfactory to the Board to insure the maintenance of all storm water facilities such as catch basins, leaching catch basins, detention basins, swales, etc. within the site. The Board may use funds provided by such security to conduct maintenance that the applicant fails to do. The Board may adjust in its sole discretion the amount and type of financial security such that it is satisfied that the amount is sufficient to provide for the future maintenance needs.

6. Utility Service. Electric, telephone, cable TV and other such lines and equipment shall be underground. The proposed method of sanitary sewage disposal and solid waste disposal from all buildings shall be indicated.
7. Advertising Features. The size, location, design, color, texture, lighting and materials of all permanent signs and outdoor advertising structures or features shall not detract from the use and enjoyment of proposed buildings and structures and the surrounding properties. Advertising features are subject to the provisions of Section 6.2 of the Zoning Bylaw.

8. **Special Features.** Exposed storage areas, exposed machinery installations, service areas, truck loading areas, utility buildings and structures, and similar accessory areas and structures shall be subject to such setbacks, screen plantings or other screening methods as shall reasonably be required to prevent their being incongruous with the existing or contemplated environment and the surrounding properties.
9. **Safety.** With respect to personal safety, all open and enclosed spaces shall be designed to facilitate building evacuation and maximize accessibility by fire, police, and other emergency personnel and equipment. Insofar as practicable, all exterior spaces and interior public and semi-public spaces shall be so designed as to minimize the fear and probability of personal harm or injury by increasing the potential surveillance by neighboring residents and passersby of any accident or attempted criminal act.
10. **Heritage.** With respect to Arlington's heritage, removal or disruption of historic, traditional or significant uses, structures, or architectural elements shall be minimized insofar as practicable, whether these exist on the site or on adjacent properties.
11. **Microclimate.** With respect to the localized climatic characteristics of a given area, any development which proposes new structures, new hard-surface ground coverage, or the installation of machinery which emits heat, vapor, or fumes, shall endeavor to minimize, insofar as practicable, any adverse impact on light, air, and water resources, or on noise and temperature levels of the immediate environment.
12. **Sustainable Building and Site Design.** Projects are encouraged to incorporate best practices related to sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Applicants must submit a current Green Building Council Leadership in Energy and Environmental Design (LEED) checklist, appropriate to the type of development, annotated with narrative description that indicates how the LEED performance objectives will be incorporated into the project. [LEED checklists can be found at <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=220b>]

In addition, projects subject to Environmental Design Review must address and meet the following Special Permit Criteria (see Section 3.3.3 of the Zoning Bylaw):

1. The use requested is listed as a special permit in the use regulations for the applicable district or is so designated elsewhere in this Bylaw.
2. The requested use is essential or desirable to the public convenience or welfare.
3. The requested use will not create undue traffic congestion or unduly impair pedestrian safety.
4. The requested use will not overload any public water, drainage or sewer system or any other municipal system to such an extent that the requested use or any developed use in the immediate area or in any other area of the Town will be unduly subjected to hazards affecting health, safety or the general welfare.
5. Any special regulations for the use as may be provided in this Bylaw are fulfilled.
6. The requested use will not impair the integrity or character of the district or adjoining districts, nor be detrimental to the health, morals, or welfare.
7. The requested use will not, by its addition to a neighborhood, cause an excess of the particular use that could be detrimental to the character of said neighborhood.

TOWN OF ARLINGTON

Dimensional and Parking Information
for Application to
The Arlington Redevelopment Board

Docket No. _____

Property Location 455-457 Massachusetts Ave

Zoning District B3

Owner: 2-14 Medford Street, LLC

Address: 455 Massachusetts Ave, Arlington, MA

Present Use/Occupancy: No. of Dwelling Units:

Retail, Service, Restaurant

Uses and their gross square feet:

2-Story 18,588 GSF

Proposed Use/Occupancy: No. of Dwelling Units:

Uses and their gross square feet:

Mixed-Use, 13 Apartment Units & Retail, Service, Restaurant 2-Story Mixed-Use, 28,373 GSF

	Present Conditions	Proposed Conditions	Min. or Max. Required by Zoning for Proposed Use
Lot Size	18,929 SF	18,929 SF	min. ----
Frontage	124.8 FT	124.8 FT	min. 50 FT
Floor Area Ratio	0.98	1.5	max. 1.5
Lot Coverage (%), where applicable	N/A	N/A	max. ----
Lot Area per Dwelling Unit (square feet)	N/A	N/A	min. ----
Front Yard Depth (feet)	0 FT	0 FT	min. 0 FT
Side Yard Width (feet) right side	----	----	min. ----
left side	0 FT	0 FT	min. 0 FT
Rear Yard Depth (feet)	0.6 FT	0.6 FT	min. (H+L)/6
Height	----	----	min. ----
Stories	2-STORY	2-STORY	stories 5-STORY
Feet	<35 FT	<35 FT	feet 60 FT
Open Space (% of G.F.A.)	----	----	min. ----
Landscaped (square feet)	0 %	24.1 %	(s.f.) 10% 1,021 SF
Usable (square feet)	0 %	0 %	(s.f.) 20% 2,042 SF
Parking Spaces (No.)	14*	16	min. 31.9
Parking Area Setbacks (feet), where applicable	N/A	N/A	min. N/A
Loading Spaces (No.)	N/A	N/A	min. N/A
Type of Construction	NEW CONSTRUCTION		
Distance to Nearest Building	0 FT	0 FT	min.

2,457 SF/10,211SF
(Res. Floor Area)

10,211 SF (Res. Floor
Area) X 0.10 = 1,021 SF

10,211 SF (Res. Floor
Area) X 0.20 = 2,042 SF

*8 SPACES FROM THE EXSITING
14 SPACES ARE TANDOM SPACES,
BLOCKED IN BY THE OTHER 6.

Updated August 28, 2018

TOWN OF ARLINGTON REDEVELOPMENT BOARD

Petition for Special Permit under Environmental Design Review (see Section 3.4 of the Arlington Zoning Bylaw for Applicability)

For projects subject to Environmental Design Review, (see Section 3.4), please submit a statement that completely describes your proposal, and addresses each of the following standards.

1. Preservation of Landscape. The landscape shall be preserved in its natural state, insofar as practicable, by minimizing tree and soil removal, and any grade changes shall be in keeping with the general appearance of neighboring developed areas.

There is no existing landscaping on-site and the proposed design will introduce an arborvitae row, shrubs, and Serviceberry tree along Park Terrace, See Allen & Major Associates, Inc planting schedule – trees, shrubs, groundcovers, and perennials dated August 20, 2021, Landscape Plan No. L-101 as part of the Applicant's submission. The existing street trees along Mass Ave will be protected and maintained. Also, the proposed design has been graded to closely match the existing building.

2. Relation of Buildings to Environment. Proposed development shall be related harmoniously to the terrain and to the use, scale, and architecture of existing buildings in the vicinity that have functional or visual relationship to the proposed buildings. The Arlington Redevelopment Board may require a modification in massing to reduce the effect of shadows on abutting property in an RO, R1 or R2 district or on public open space.

The proposed construction has been developed in a manner consistent with the existing building structures at the site and to the use, scale, and architecture of existing building in the vicinity of the property that have functional or visual relationship to the proposed construction. No part of the proposed structure is higher than the existing structure. Shadows from the proposed structure will not have an adverse impact on any Residential (R) use.

3. Open Space. All open space (landscaped and usable) shall be so designed as to add to the visual amenities of the vicinity by maximizing its visibility for persons passing the site or overlooking it from nearby properties. The location and configuration of usable open space shall be so designed as to encourage social interaction, maximize its utility, and facilitate maintenance.

The existing site has no open space. The Applicant proposes to add 2,457 square feet of landscaped open space. This area includes planted areas and pervious

paver systems. This area has been calculated to 24.1% of the residential floor area.

4. Circulation. With respect to vehicular, pedestrian and bicycle circulation, including entrances, ramps, walkways, drives, and parking, special attention shall be given to location and number of access points to the public streets (especially in relation to existing traffic controls and mass transit facilities), width of interior drives and access points, general interior circulation, separation of pedestrian and vehicular traffic, access to community facilities, and arrangement of vehicle parking and bicycle parking areas, including bicycle parking spaces required by Section 8.13 that are safe and convenient and, insofar as practicable, do not detract from the use and enjoyment of proposed buildings and structures and the neighboring properties.

The existing parking situation is not functional. 8 spaces from the existing 14 spaces are tandem spaces blocked in by other 6 spaces. The proposed layout provides a functional 16 spaces.

5. Surface Water Drainage. Special attention shall be given to proper site surface drainage so that removal of surface waters will not adversely affect neighboring properties or the public storm drainage system. Available Best Management Practices for the site should be employed and include site planning to minimize impervious surface and reduce clearing and re-grading. Best Management Practices may include erosion control and storm water treatment by means of swales, filters, plantings, roof gardens, native vegetation, and leaching catch basins. Storm water should be treated at least minimally on the development site; that which cannot be handled on site shall be removed from all roofs, canopies, paved and pooling areas and carried away in an underground drainage system. Surface water in all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian traffic and will not create puddles in the paved areas.

Surface water drainage at the site will be improved with the installation of pervious paver systems and an underground infiltration system. These systems will receive clean roof runoff for storm water recharge and greatly reduce the quantity of stormwater runoff from the parcel.

The proposed work will also result in approximately 1,008 square feet of impervious material being replaced with landscaped areas. See Allen & Major Associates, Inc. letter to the Director of Planning & Community Development dated August 20, 2021.

In accordance with Section 3.3.4, the Board may require from any applicant, after consultation with the Director of Public Works, security satisfactory to the Board to insure the maintenance of all storm water facilities such as catch basins, leaching catch basins, detention basins, swales, etc. within the site. The Board may use funds provided by such security to conduct maintenance that the applicant fails to do. The Board may

adjust in its sole discretion the amount and type of financial security such that it is satisfied that the amount is sufficient to provide for the future maintenance needs.

6. Utility Service. Electric, telephone, cable TV and other such lines and equipment shall be underground. The proposed method of sanitary sewage disposal and solid waste disposal from all buildings shall be indicated.

Utility service would be through a tie into existing utility lines at the site.

7. Advertising Features. The size, location, design, color, texture, lighting and materials of all permanent signs and outdoor advertising structures or features shall not detract from the use and enjoyment of proposed buildings and structure and the surrounding properties. Advertising features are subject to the provisions of Section 6.2 of the Zoning Bylaw.

Any proposed relief with respect to advertising signage will be initially through the Planning Department for the purpose of determining whether any signage issues can be handled administratively or whether those issues need to go before the ARB.

8. Special Features. Exposed storage areas, exposed machinery installations, service areas, truck loading areas, utility buildings and structures, and similar accessory areas and structures shall be subject to such setbacks, screen plantings or other screening methods as shall reasonably be required to prevent their being incongruous with the existing or contemplated environment and the surrounding properties.

9. Safety. With respect to personal safety, all open and enclosed spaces shall be designed to facilitate building evacuation and maximize accessibility by fire, police, and other emergency personnel and equipment. Insofar as practicable, all exterior spaces and interior public and semi-public spaces shall be so designed as to minimize the fear and probability of personal harm or injury by increasing the potential surveillance by neighboring residents and passersby of any accident or attempted criminal act.

With respect to personal safety all open and enclosed spaces have been designed to facilitate building evacuation and maximize accessibility by fire, police, and other emergency personnel and equipment. All spaces have been designed to comply with applicable codes and ordinances.

10. Heritage. With respect to Arlington's heritage, removal, or disruption of historic, traditional, or significant uses, structures, or architectural elements shall be minimized insofar as practicable, whether these exist on the site or on adjacent properties.

The Applicant understands that it will need to appear before the Arlington Historical Commission with respect to its plans as both structures i.e., the Massachusetts Avenue structure and the 4-14 Medford Street structure are part of

the Arlington Center Historic District, although only the 4-14 Medford Street structure is a contributing historic structure.

11. Microclimate. With respect to the localized climatic characteristics of a given area, any development which proposes new structures, new hard-surface ground coverage, or the installation of machinery which emits heat, vapor, or fumes, shall endeavor to minimize, insofar as practicable, any adverse impact on light, air, and water resources, or on noise and temperature levels of the immediate environment.

Adequate provision has been made for any emission of heat vapor fumes from the property so as to endeavor to minimize, insofar as practicable, any adverse impact on light, air and water resources, or noise and temperature levels of the immediate environment.

12. Sustainable Building and Site Design. Projects are encouraged to incorporate best practices related to sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Applicants must submit a current Green Building Council Leadership in Energy and Environmental Design (LEED) checklist, appropriate to the type of development, annotated with narrative description that indicates how the LEED performance objectives will be incorporated into the project. [LEED checklists can be found at <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=220b>]

See LEED submission for the project dated August 11, 2021, as part of the Applicant's submission.

In addition, projects subject to Environmental Design Review must address and meet the following Special Permit Criteria (see Section 3.3.3 of the Zoning Bylaw):

1. The use requested is listed as a special permit in the use regulations for the applicable district or is so designated elsewhere in this Bylaw.

The use requested is listed as a Special Permit in the use regulations for the applicable district. See Section 5.5.2 (a) Districts and Uses contained within the Zoning Bylaw.

2. The requested use is essential or desirable to the public convenience or welfare.

The requested use is essential or desirable to the public convenience or welfare because a portion of the property has been vacant for a substantial period of time within Arlington Center and the proposal seeks to add a restaurant use as well as residential use to the site on mixed-use basis which comports with the provisions of the Master Plan.

3. The requested use will not create undue traffic congestion or unduly impair pedestrian safety.

The requested use will not create undue traffic congestion or unduly impair pedestrian safety as indicated within the substance of the Applicant's plans.

4. The requested use will not overload any public water, drainage or sewer system or any other municipal system to such an extent that the requested use or any developed use in the immediate area or in any other area of the Town will be unduly subjected to hazards affecting health, safety, or the general welfare.

The requested use will not overload any public water, drainage or sewer system or any municipal system.

5. Any special regulations for the use as may be provided in this Bylaw are fulfilled.

Any special regulations for the use as may be provided for in the Bylaw are fulfilled.

6. The requested use will not impair the integrity or character of the district or adjoining districts, nor be detrimental to the health, morals, or welfare.

The requested use will not impair the integrity or character of the district or adjoining districts, nor be detrimental to the health, morals, or welfare, but rather it will enhance the integrity and character of the district and adjoining districts because of the addition of a restaurant use as well as more residential use which again comports with the substance Master Plan and the design of the changes to

the existing building do not result in massing issues but rather is compatible with the physical characteristics of other buildings in the neighborhood of the property.

7. The requested use will not, by its addition to a neighborhood, cause an excess of the particular use that could be detrimental to the character of said neighborhood.

The requested use will not, by its addition to a neighborhood, cause an excess of that use which could be detrimental to the character of said neighborhood because the requested use will enhance the character of the neighborhood because of the nature and type of the construction which will fit in nicely with adjoining structures in the district.

455-457 Massachusetts Avenue

Arlington, MA

Environmental Impact Statement

The Petitioner is requesting a Special Permit for a mixed-use development project at 455-457 Massachusetts Avenue and 4-14 Medford Street.

The site is located on the corner of Medford Street and Massachusetts Avenue in a B3 zone and there is an existing curb cut to the parcel located off of Park Terrace to the rear of the parcel.

The lot size is 18,929 square feet and the property has frontage of 124.8 feet on both Massachusetts Avenue and Medford Street while zoning requires 50 feet.

The changes to the building will result in a mixed-use building containing thirteen (13) apartment units with a retail, service and restaurant component with the gross square feet of the mixed-use building containing 28,373 square feet.

The floor area ration is presently 0.98 and the proposed FAR is 1.5 and the requirement for zoning is 1.5.

There is a zero-foot front yard setback and there is zero right and left side setback.

The rear yard depth is 0.6 feet, and the proposed rear yard depth will also be 0.6 feet.

The current height of the building is a two-story building, and the proposed height would also be a two-story building while zoning in the B3 zone would allow a five-story height.

The height in feet of the existing building is 35 feet and the proposed height would also be 35 feet while zoning would allow 60 feet.

There is presently no open space at the site and the Petitioner's plans propose to add 2,457 square feet of landscaped open space including planted areas and pervious paver systems which would result in the landscaped open space having a percentage of 24.1% of the residential floor area.

There is no existing usable open space and there is no ability to create usable open space and it would be the Petitioner's position that the existing building is non-conforming with respect to the usable open space requirement contained in the zoning

bylaw and the proposed changes to the building do not increase the non-conformity to the extent that the non-conformity with respect to usable open space is extinguished.

There are presently fourteen (14) parking spaces at the site and sixteen (16) are proposed while zoning requires 30.19 parking spaces. Petitioner will be seeking zoning relief with respect to Section 6.1.5 (c) of the zoning bylaw with regard to a reduction in the parking requirement in accordance with the transportation demand management provisions of the zoning bylaw.

Waivers are being requested with respect Section 6.1.11 – Parking Standards - Petitioner is requesting that the drive aisle width requirement be reduced from 24 feet to 20 feet as well as a reduction in the amount of parking spaces required and the manner of which parking will occur on the site.

A waiver is also being requested in connection with 5.3.21 – the screening and buffering requirements contained in the bylaw as the Petitioner's proposed plans do not allow for the required buffer along the rear of the lot abutting the R1 zone.

A waiver is also being requested in connection with Section 5.3.16 – Setback Requirements – which section gives the ARB the authority to grant a special permit to adjust the required setbacks contained in the bylaw to account for specific conditions unique to the proposal.

It is Petitioner's position that the existing configuration of the lot and the plans to not change the character of the site significantly would represent conditions unique to the proposal allowing the ARB to grant relief with respect to this section of the bylaw.

Relief is also sought from the provisions of Section 5.3.19, i.e., reduced height buffer. It is the Petitioner's position that if this waiver is required, it may already be complying with its provisions as its plans will have no adverse effect on abutting uses (school, church) in the R1 district.

Relief is also sought from Section 3.3.8, the corner lot requirement contained in the bylaw.

Relief would also be sought, if necessary, from the provisions of Section 5.2.4, the multiple principal use section of the zoning bylaw as there will be two uses with respect to the property, i.e., a commercial use as well as a residential use.

Petitioner is providing covered bicycle parking and storage and is prepared to provide bicycle sharing on site and would be open to other means acceptable to the ARB with respect to satisfying the provisions of the transportation demand management provisions of the zoning bylaw.

It is the Petitioner's position that its proposal if approved by the ARB will result in a welcome addition to the heart of Arlington Center, large portions of which have fallen into disuse over many years as the design will add thirteen (13) residential apartments which could be a step toward enlivening retail activity in Arlington Center, an element which has been sorely missed for many years.

It is also the Petitioner's position that its planned design will have no adverse environmental impact upon the neighborhood in which the property is located but rather will result in an improvement to the neighborhood by adding a mix of residential and commercial uses at the site comporting with objectives set forth within the substance of Master Plan.

* 2020 Market Square Architects R-12/2021 9:51 OF PM

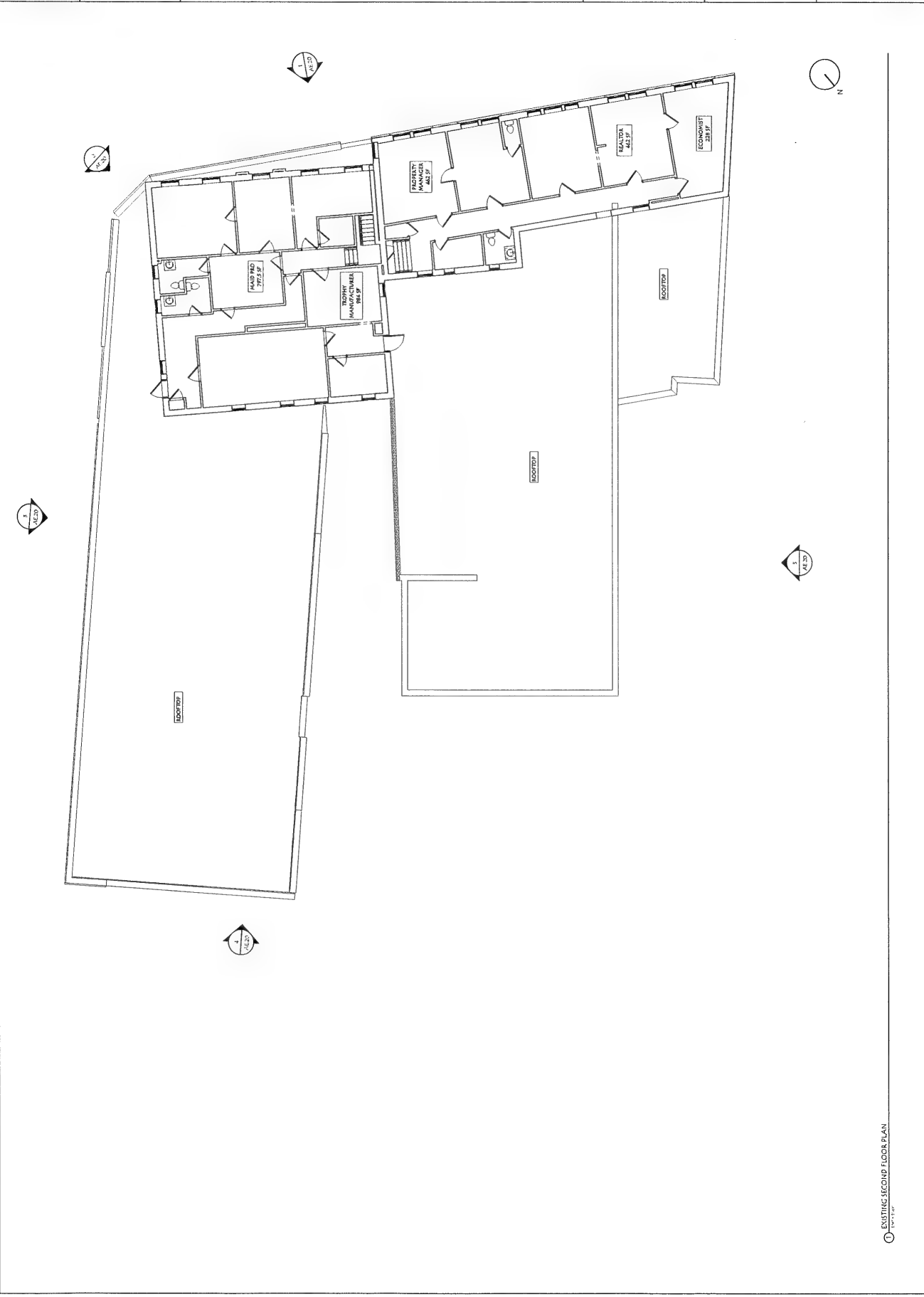
Title: AE.02
 EXISTING SECOND FLOOR PLAN

Scale: 1/8" = 1'-0"
 Drawn By: VLA, WCB
 Checked By: 202054
 Project No.: 07/27/20

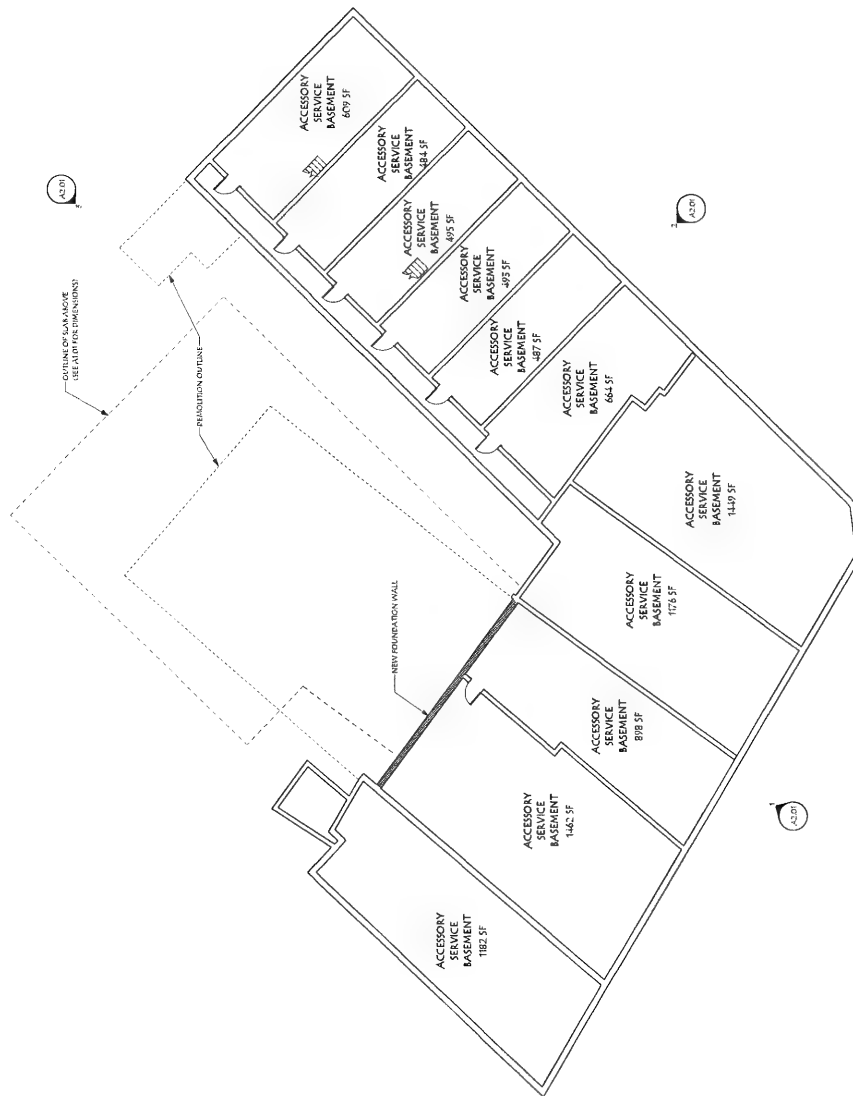
Revisions:	#	Description	Date

455 MASSACHUSETTS AVENUE
 455 MASSACHUSETTS AVENUE
 ARLINGTON, MA

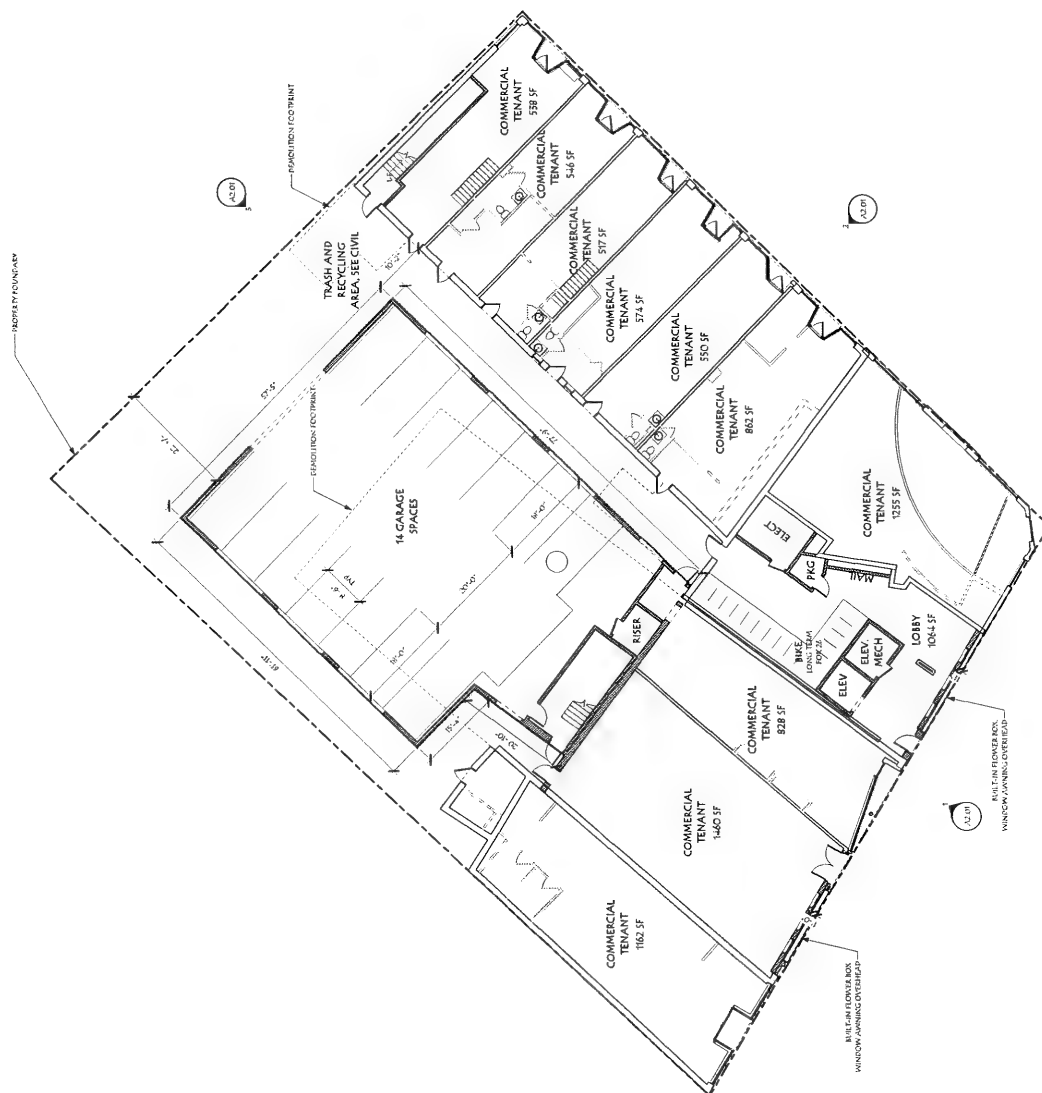
NOT FOR CONSTRUCTION
 ARCHITECTS
 100 CONANT ST., 10TH FLOOR
 BOSTON, MA 02110
 TEL: 617.552.1000



EXISTING SECOND FLOOR PLAN
 1/2" = 1'-0"



1
BASEMENT
SCALE: 3/32" = 1'-0"



1 LEVEL 1
SCALE: 3/32" = 1'

A1.02

OVERALL SECOND
FLOOR PLAN

Title: OVERALL SECOND FLOOR PLAN
Scale: As Indicated
Drawn By: PPS
Checked By: ALW
Project No.: 2020054
Date: 08/20/21
Schematic Design

NOT FOR CONSTRUCTION

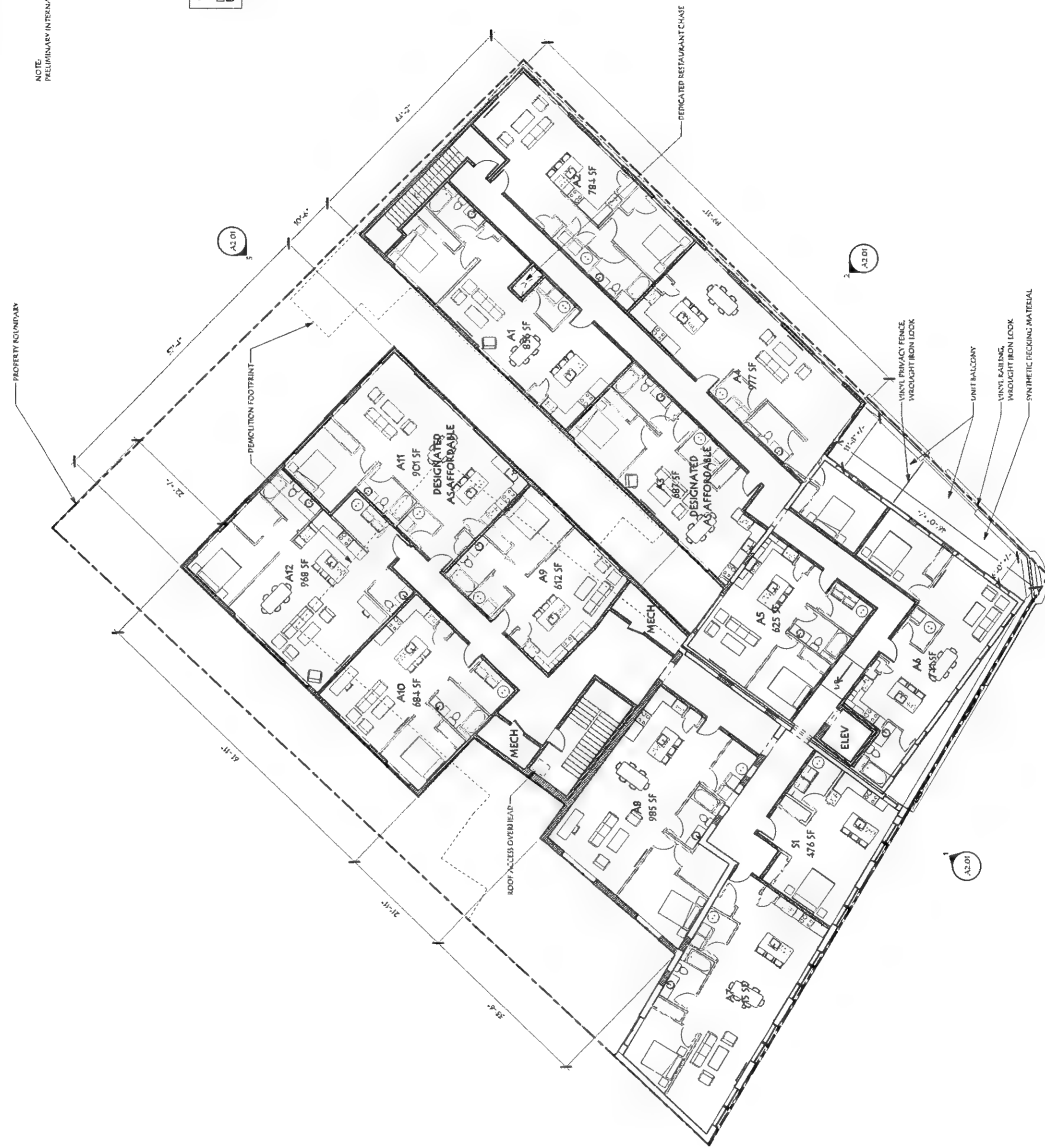
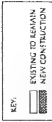
ARLINGTON MIXED USE
455 MASS AVE
ARLINGTON, MA

AR
ARCHITECTS
100 COLUMBIA ST, 2ND FLOOR
CAMBRIDGE, MA 02142
TEL: 617.552.1000
WWW.ARARCHITECTS.COM

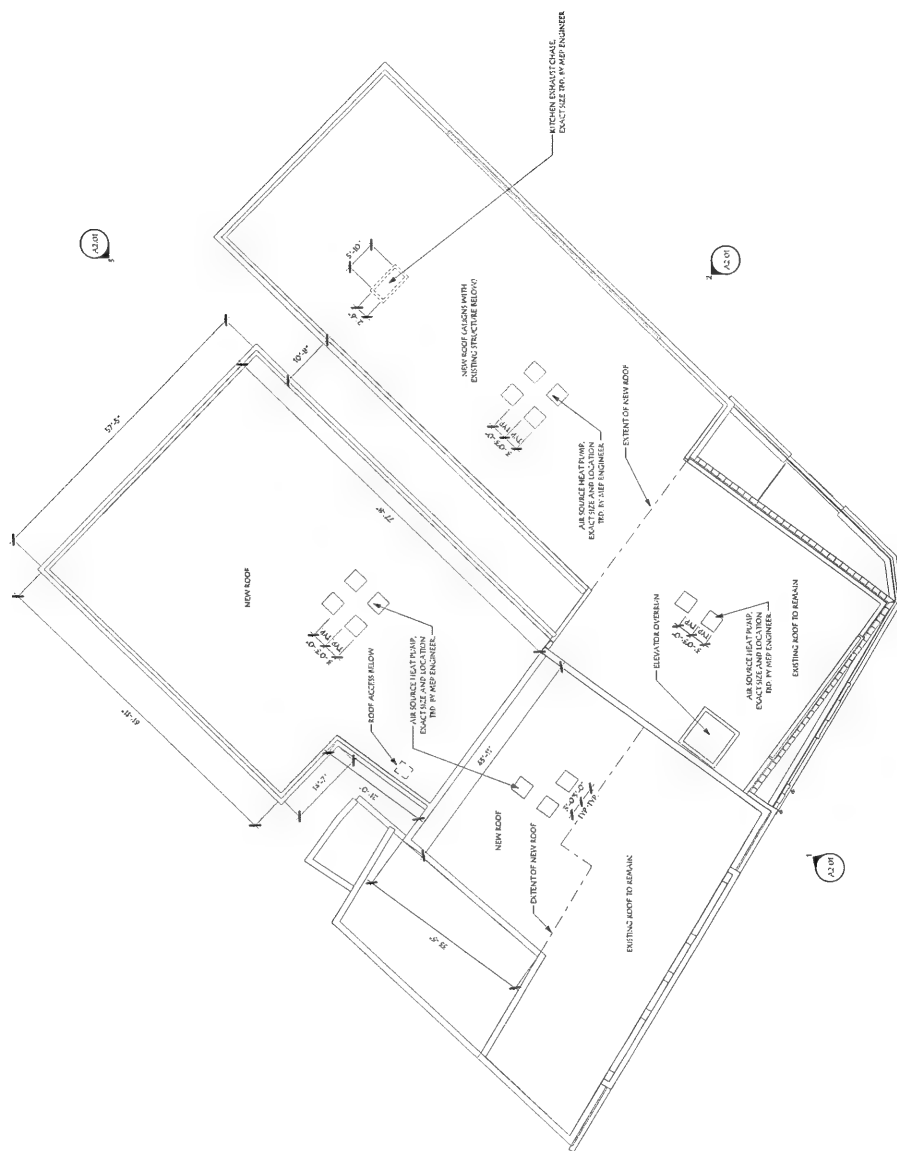
UNIT MATRIX:

	#	1 UNIT	85
TOTAL		12 UNITS	925
STUDIO		12 UNITS	925
1 BED		12 UNITS	925
TOTAL		12 UNITS	925

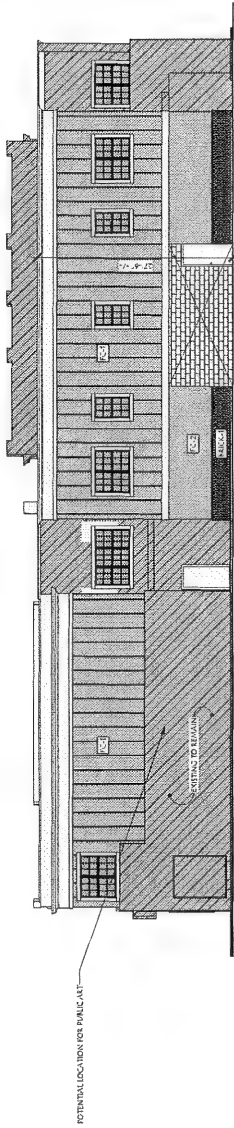
NOTE:
Preliminary Internal Unit Layout shown. Final Landcut may vary.



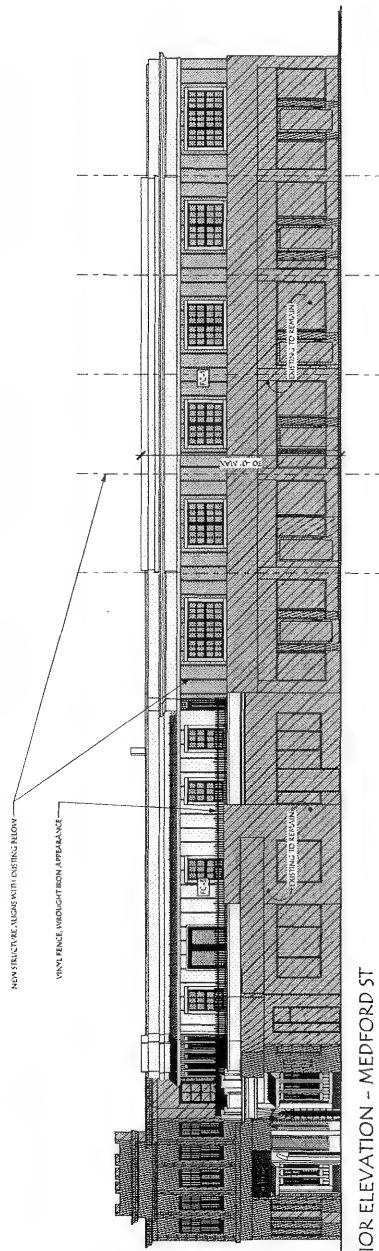
LEVEL 2
SCALE: 3/32" = 1'-0"



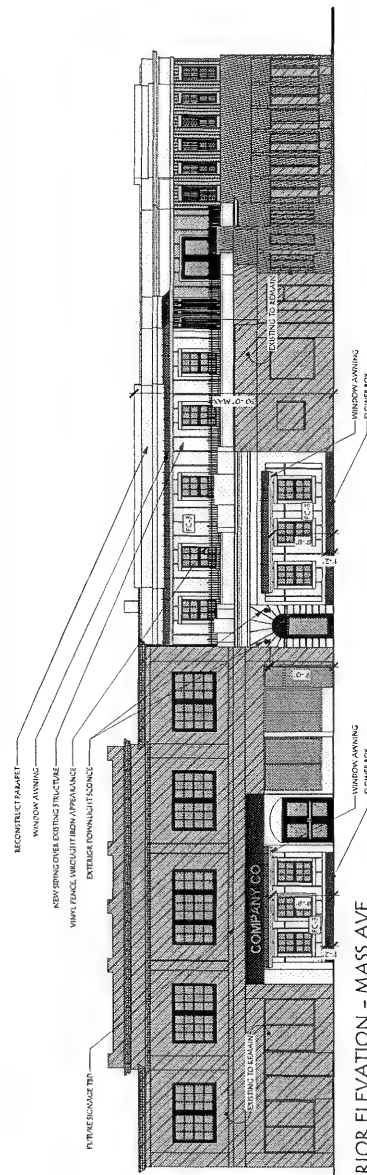
FC-1 BOARD AND BATTEN FIBER CEMENT (LT GREEN)
FC-2 CLAPBOARD FIBER CEMENT (LT GREEN)
FC-3 BOARD AND BATTEN FIBER CEMENT (WHITE)
BRICK-1 BRICK FINISH



3



2



1

A9.01

CORNER RENDER

Title:
Scale:
Drawn By:
Checked By:
Project No.:
Date:

Revisions:
By: [Signature]
Date:

NOT FOR
CONSTRUCTION

ARLINGTON MIXED USE
455 MASS AVE
ARLINGTON, MA

ARCHITECTS
100 SCOTT ST., 11th FLOOR
BOSTON, MA 02110
TEL: 617.552.1000



Title: MEDFORD ST
RENDER
A9.02

Scale:
Drawn By: ALW
Checked By: ALW
Project No.: 2020085
Date: 08/20/21

Revisions:
Date:
NOT FOR CONSTRUCTION

ARLINGTON MIXED USE
455 MASS AVE
ARLINGTON, MA

AR

ARCHITECTS

100 CORNHILL, 11th FLOOR
CAMBRIDGE, MA 02102
TEL: 617.552.0002





LEED v4 for Building Design and Construction: Homes and Multifamily Lowrise
Project Name: 455 Massachusetts Ave, Arlington, MA 02476
Date: 8/11/2021

Y	?	N	Credit	Integrative Process	2
Y					
14	1	0	Location and Transportation		15
			Floodplain Avoidance	Prereq	Required
			PERFORMANCE PATH		
			LEED for Neighborhood Development Location	Credit	15
			PRESCRIPTIVE PATH		
8			Site Selection	Credit	8
2	1		Compact Development	Credit	3
2			Community Resources	Credit	2
2			Access to Transit	Credit	2
4	0	3	Sustainable Sites		7
			Construction Activity Pollution Prevention	Prereq	Required
Y			No Invasive Plants	Prereq	Required
2			Heat Island Reduction	Credit	2
		3	Rainwater Management	Credit	3
2			Non-Toxic Pest Control	Credit	2
4	0	6	Water Efficiency		12
			Water Metering	Prereq	Required
			PERFORMANCE PATH		
			Total Water Use	Credit	12
			PRESCRIPTIVE PATH		
4		2	Indoor Water Use	Credit	6
		4	Outdoor Water Use	Credit	4
12	19	6	Energy and Atmosphere		38
			Minimum Energy Performance	Prereq	Required
Y			Energy Metering	Prereq	Required
Y			Education of the Homeowner, Tenant or Building Manager	Prereq	Required
			PERFORMANCE PATH		
			Annual Energy Use	Credit	29
			BOTH PATHS		
2	3		Efficient Hot Water Distribution System	Credit	5
	1	1	Advanced Utility Tracking	Credit	2
1			Active Solar Ready Design	Credit	1
	1		HVAC Start-Up Credentialing	Credit	1
			PRESCRIPTIVE PATH		
Y			Home Size	Prereq	Required
	3		Building Orientation for Passive Solar	Credit	3
2			Air Infiltration	Credit	2
	2		Envelope Insulation	Credit	2
3			Windows	Credit	3
	4		Space Heating & Cooling Equipment	Credit	4
EA PRESCRIPTIVE PATH (continued)					
	3		Heating & Cooling Distribution Systems	Credit	3
	3		Efficient Domestic Hot Water Equipment	Credit	3
	2		Lighting	Credit	2
	2		High Efficiency Appliances	Credit	2
	4		Renewable Energy	Credit	4
Materials and Resources					
3	5	2			10
Y			Certified Tropical Wood	Prereq	Required
Y			Durability Management	Prereq	Required
	1		Durability Management Verification	Credit	1
	4		Environmentally Preferable Products	Credit	4
3			Construction Waste Management	Credit	3
	2		Material Efficient Framing	Credit	2
Indoor Environmental Quality					
8	6	2			16
Y			Ventilation	Prereq	Required
Y			Combustion Venting	Prereq	Required
Y			Garage Pollutant Protection	Prereq	Required
Y			Radon-Resistant Construction	Prereq	Required
Y			Air Filtering	Prereq	Required
Y			Environmental Tobacco Smoke	Prereq	Required
Y			Compartmentalization	Prereq	Required
1	2		Enhanced Ventilation	Credit	3
2			Contaminant Control	Credit	2
	3		Balancing of Heating and Cooling Distribution Systems	Credit	3
	1		Enhanced Compartmentalization	Credit	1
2			Enhanced Combustion Venting	Credit	2
	2		Enhanced Garage Pollutant Protection	Credit	2
3			Low Emitting Products	Credit	3
Innovation					
0	2	4			6
Y			Preliminary Rating	Prereq	Required
	1	4	Innovation	Credit	5
	1		LEED AP Homes	Credit	1
Regional Priority					
0	4	0			4
	1		Regional Priority: Specific Credit	Credit	1
	1		Regional Priority: Specific Credit	Credit	1
	1		Regional Priority: Specific Credit	Credit	1
	1		Regional Priority: Specific Credit	Credit	1
45	37	23	TOTALS		Possible Points: 110
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110					

John --

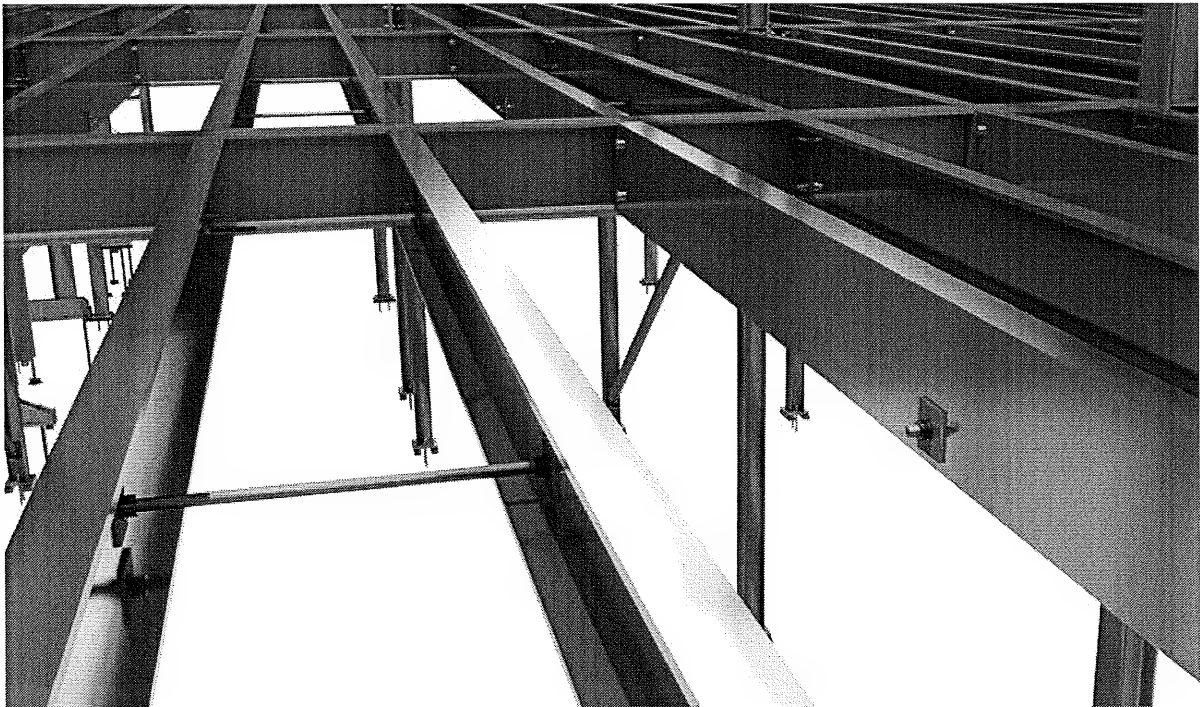
With the 455 Mass Ave. project the process here to develop the upper level residential...

- Prep existing masonry structure to receive new structural supports / beams that we would call "fly over" construction, these beams would run over the existing roof structure allowing a small interstitial space to run MEP mains, branch lines, water & sewer.
- The fly over beams ideally would have intermediate structural steel beams, smaller in size to space from one fly over beam to the next, thereby creating a grid size roughly 8 ft x 8 ft, we would install 4-inch-thick metal decking, we would install t-studs and pour a light-weight concrete slab.
- We would use the new upper-level slab as our starting point to frame in either wood or light gauge metal framing (LGMF) all new walls and roof system for the new upper residential units.
- We would extend all MEP items that run through the roof and continue these through the upper floor and through the new roof, some may be consolidated if possible.
- We would construct the new addition on a standard spread footing below frost extending up above grade with a new 12" thick foundation, this foundation will support the upper level, through a formed concrete or "cast in place" structural wall and in combination support structural steel beams to support the new second floor system, this will match the height of the new fly-over steel/concrete slab so all upper levels are on the same level.
- And same method used for the fly-over slab we would frame in either wood or light gauge metal framing (LGMF) all new walls and roof system for the new upper residential units.
- The new stair tower and the renovated lobby we are recommending to be built out of a masonry CMU (Masonry Block) walls, with proper fire ratings, assume a steel diamond plate stair system with standard railings to the new 2nd floor.
- We need to allow for demolition of the existing 2nd floor building and framing, this would all need to be removed and we can install a temporary rubber roof system installed over the existing wood framed floor system, this system is similar to the existing roof framing that would remain on the first section.
- Provisions need to be made to enhance the existing brick bearing walls to accommodate the new structural flyover construction, this will mean that on selective evenings we will need to enter the retail spaces below to reinforce the masonry wall to accept new beams

above, this can be done relatively quickly and most of the work would be prefabricated 4-inch tube steel columns installed directly to the walls and bolted or welded to the structure, drilling through the wall from the outside and running galvanized threaded rod through the masonry wall and attached to the new steel columns.

I hope this helps explain the process to build this exciting project.







Issued: August 20, 2021

Jennifer Raitt
Director of Planning & Community
Development
730 Massachusetts Ave
Arlington, MA 02476

RE: Mixed-Use Redevelopment
Drainage Summary Letter
455-457 Massachusetts Ave
Arlington, MA 02476

Dear Ms. Raitt,

On behalf of our Client, 2-4 Medford Street, LLC, Allen & Major Associates (A&M) is pleased to provide this letter in support of the Special Permit application for the Mixed-Use Redevelopment project at 455-457 Massachusetts Ave. This letter will summarize the changes to the stormwater management system which are proposed as part of the redevelopment efforts.

Existing Conditions

The site is located on the corner of Medford Street and Massachusetts Avenue. There is an existing curb cut to the parcel located off Park Terrace to the rear of the parcel. The existing lot is entirely impervious with existing building and pavement. Elevations onsite range from elevation 38 along Mass Ave to elevation 36 at the rear along Park Terrace. The majority of the stormwater on-site flows via sheet flow off-site to Park Terrace. A review of the NRCS soil report for Middlesex County indicates that the soil onsite is considered Merrimac-Urban Land which has a Hydrologic Soil Group rating of an "A". A copy of the Existing Watershed Plan is included herewith.

Proposed Conditions

The project, proposes to demolish a portion of the existing structure and construct and addition in a similar location. The project proposes to maintain existing retail, restaurant and service uses on the ground floor, and construct new apartments on the second floor. There are 16 parking stalls proposed on the first level. The stormwater management system will be greatly improved with the installation of pervious paver systems and underground infiltration system. These systems will receive clean roof runoff for stormwater recharge. These systems will greatly reduce the quantity of stormwater runoff from the parcel. The proposed work will also result in approximately 1,008 square feet of impervious material being replaced with landscaped areas.

Runoff flows were estimated for both pre and post development conditions using HydroCAD 10.00 software, at a specific "Study Point" (SP-1). Study Point 1 is the flows that will flow via sheet flow onto Park Terrace. The table below shows that the project causes a reduction in the peak rate of runoff and volume of stormwater leaving the site at the Study Point. Copies of the HydroCAD worksheets and Watershed Plans are included herewith.

STUDY POINT #1 (flow to municipal system)			
	2-Year	10-Year	100-Year
Existing Flow (CFS)	1.41	2.16	3.93
Proposed Flow (CFS)	0.08	0.13	0.50
Decrease (CFS)	1.33	2.03	3.43
Existing Volume (CF)	4,728	7,356	13,644
Proposed Volume (CF)	235	400	975
Decrease (CF)	4,493	6,956	12,669

The surface water drainage requirements of the Town of Arlington Zoning Bylaw Environmental Design Review Standards have been reviewed and met with the proposed design. The proposed project will introduce stormwater infiltration systems and landscaped areas to the site to reduce the impervious area. The Town of Arlington, Article 15 Stormwater Mitigation, shall not apply as the proposed development will introduce a reduction in impervious area. However, with the proposed infiltration systems the project will reduce the runoff rates for all design storms, and comply with this bylaw.

Summary

As shown in the table above, the proposed development will have a positive impact on the stormwater management system by reducing the rate and volume of stormwater runoff from the site.

Very truly yours,

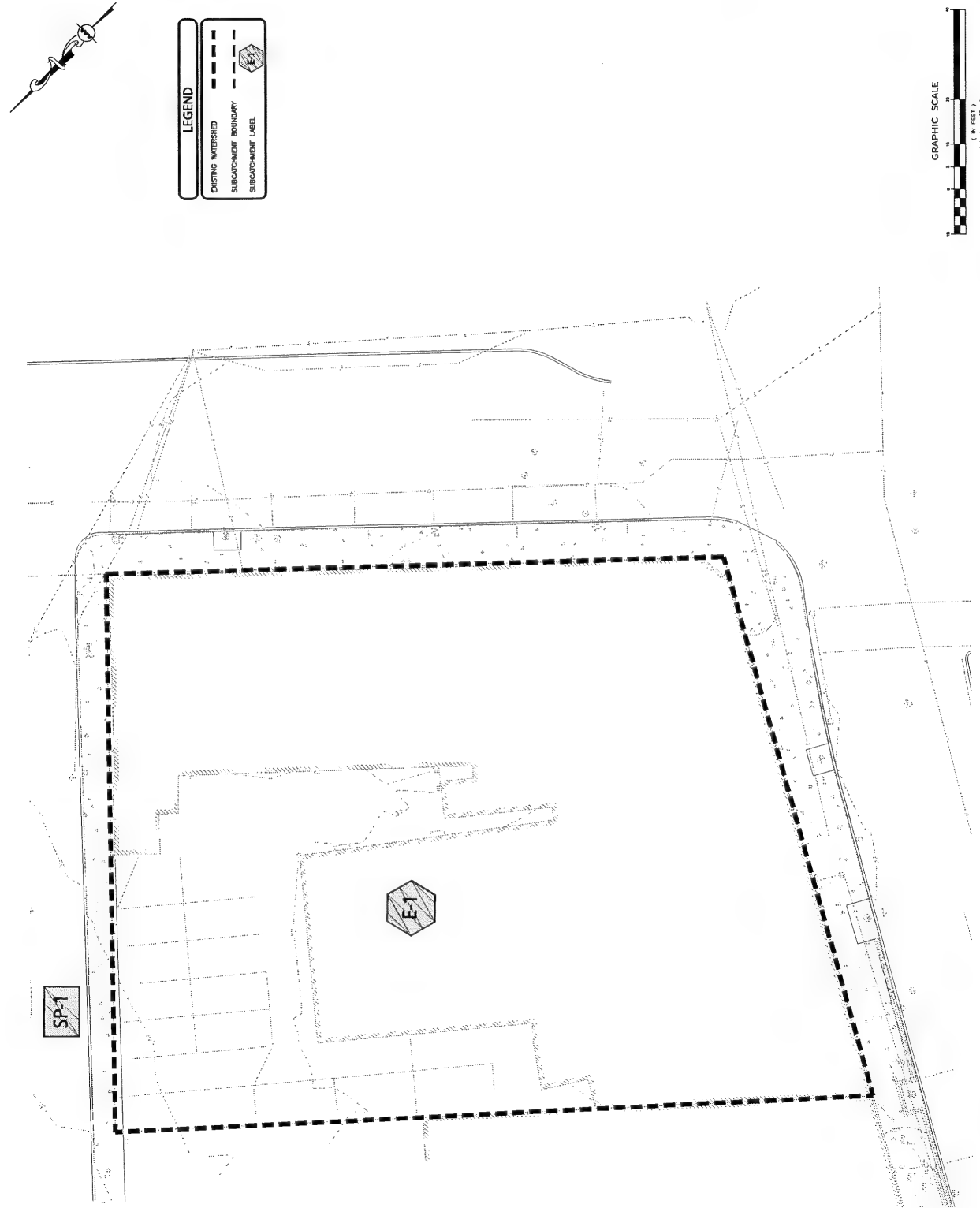
ALLEN & MAJOR ASSOCIATES, INC.



Aaron Mackey, PE
Project Engineer

Attachments:

1. Existing Watershed Plan
2. Proposed Watershed Plan
3. Pre development HydroCAD Calculations
4. Post development HydroCAD Calculations
5. Extreme Precipitation Tables
6. NRCS Soil Report



**PROGRESS PRINT
ISSUED FOR REVIEW**
AUGUST 11, 2021

[illegible]

2-14 MEDFORD STREET, LLC
455 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

PROJECT:
455-457
MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO.	2729-03	DATE:	8/11/2021
SCALE:	1" = 10'	DWG. NAME:	C2729-03
DESIGNED BY:	JG/ARM	CHECKED BY:	ARM/SD

AM

**ALLEN & MAJOR
ASSOCIATES, INC.**

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city engineering • land surveying

www.allenmajor.com

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FAX: (972) 934-2568

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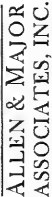
DRAWING TITLE:	SHEET NO.
EXISTING WATERSHED PLAN	EWP

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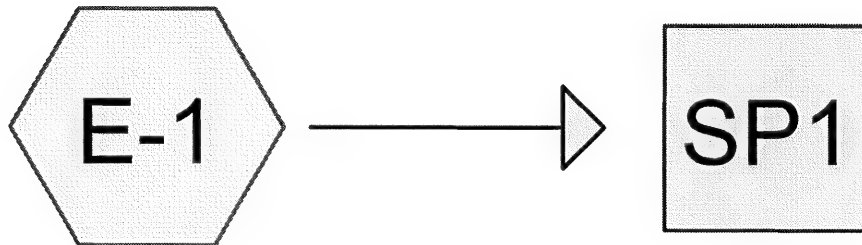
PROJECT NO.	2729-03	DATE:	8/11/2021
SCALE:	1" = 10'	DWG. NAME	C2729-03
DESIGNED BY:	JG/ARM	CHECKED BY:	ARM/BD



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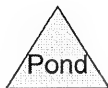
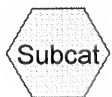
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DRAWING TITLE:
PROPOSED WATERSHED PLAN



Subcat E-1

Study Point 1



2729-03_Existing-Conditions

Prepared by Allen & Major Associates Inc.

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
18,929	98	Paved parking, HSG A (E-1)
18,929	98	TOTAL AREA

2729-03_Existing-Conditions

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
18,929	HSG A	E-1
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
18,929		TOTAL AREA

2729-03_Existing-Conditions

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
18,929	0	0	0	0	18,929	Paved parking	E-1
18,929	0	0	0	0	18,929	TOTAL AREA	

2729-03_Existing-Conditions*Type III 24-hr 2-Year Rainfall=3.23"*

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Page 5

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE-1: Subcat E-1

Runoff Area=18,929 sf 100.00% Impervious Runoff Depth=3.00"

Tc=5.0 min CN=98 Runoff=1.41 cfs 4,728 cf

Reach SP1: Study Point 1

Inflow=1.41 cfs 4,728 cf

Outflow=1.41 cfs 4,728 cf

Total Runoff Area = 18,929 sf Runoff Volume = 4,728 cf Average Runoff Depth = 3.00"
0.00% Pervious = 0 sf 100.00% Impervious = 18,929 sf

2729-03 Existing-Conditions

Type III 24-hr 2-Year Rainfall=3.23"

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Page 6

Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.41 cfs @ 12.07 hrs, Volume= 4,728 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
18,929	98	Paved parking, HSG A
18,929		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 18,929 sf, 100.00% Impervious, Inflow Depth = 3.00" for 2-Year event

Inflow = 1.41 cfs @ 12.07 hrs, Volume= 4,728 cf

Outflow = 1.41 cfs @ 12.07 hrs, Volume= 4,728 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

2729-03_Existing-Conditions*Type III 24-hr 10-Year Rainfall=4.90"*

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Page 7

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE-1: Subcat E-1

Runoff Area=18,929 sf 100.00% Impervious Runoff Depth=4.66"

Tc=5.0 min CN=98 Runoff=2.16 cfs 7,356 cf

Reach SP1: Study Point 1

Inflow=2.16 cfs 7,356 cf

Outflow=2.16 cfs 7,356 cf

Total Runoff Area = 18,929 sf Runoff Volume = 7,356 cf Average Runoff Depth = 4.66"
0.00% Pervious = 0 sf 100.00% Impervious = 18,929 sf

2729-03_Existing-Conditions

Type III 24-hr 10-Year Rainfall=4.90"

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Page 8

Summary for Subcatchment E-1: Subcat E-1

Runoff = 2.16 cfs @ 12.07 hrs, Volume= 7,356 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
18,929	98	Paved parking, HSG A
18,929		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 18,929 sf, 100.00% Impervious, Inflow Depth = 4.66" for 10-Year event

Inflow = 2.16 cfs @ 12.07 hrs, Volume= 7,356 cf

Outflow = 2.16 cfs @ 12.07 hrs, Volume= 7,356 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

2729-03_Existing-Conditions*Type III 24-hr 100-Year Rainfall=8.89"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE-1: SubcatE-1

Runoff Area=18,929 sf 100.00% Impervious Runoff Depth=8.65"

Tc=5.0 min CN=98 Runoff=3.93 cfs 13,644 cf

Reach SP1: Study Point 1

Inflow=3.93 cfs 13,644 cf

Outflow=3.93 cfs 13,644 cf

Total Runoff Area = 18,929 sf Runoff Volume = 13,644 cf Average Runoff Depth = 8.65"
0.00% Pervious = 0 sf 100.00% Impervious = 18,929 sf

2729-03_Existing-Conditions

Type III 24-hr 100-Year Rainfall=8.89"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 3.93 cfs @ 12.07 hrs, Volume= 13,644 cf, Depth= 8.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
18,929	98	Paved parking, HSG A
18,929		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

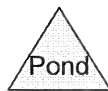
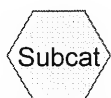
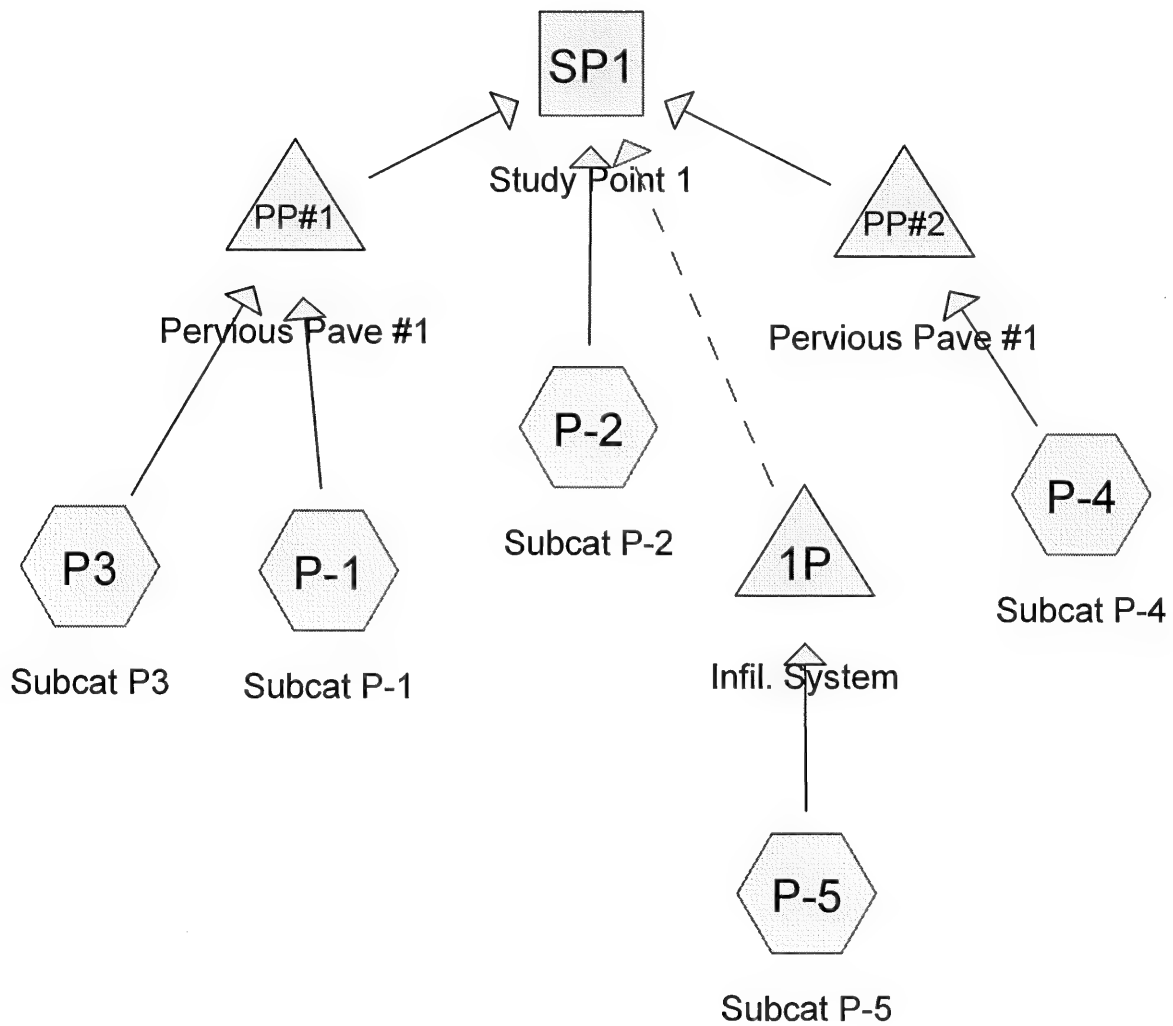
Summary for Reach SP1: Study Point 1

Inflow Area = 18,929 sf, 100.00% Impervious, Inflow Depth = 8.65" for 100-Year event

Inflow = 3.93 cfs @ 12.07 hrs, Volume= 13,644 cf

Outflow = 3.93 cfs @ 12.07 hrs, Volume= 13,644 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3



2729-03_Proposed-Conditions

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,082	39	>75% Grass cover, Good, HSG A (P-1, P-2, P-4, P3)
2,803	98	Paved parking, HSG A (P-1, P-2, P-4, P-5, P3)
15,043	98	Roofs, HSG A (P-1, P-5)
18,929	95	TOTAL AREA

2729-03_Proposed-Conditions

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
18,929	HSG A	P-1, P-2, P-4, P-5, P3
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
18,929		TOTAL AREA

2729-03_Proposed-Conditions

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
1,082	0	0	0	0	1,082	>75% Grass cover, Good	P-1, P-2, P-4, P3
2,803	0	0	0	0	2,803	Paved parking	P-1, P-2, P-4, P-5, P3
15,043	0	0	0	0	15,043	Roofs	P-1, P-5
18,929	0	0	0	0	18,929	TOTAL AREA	

2729-03_Proposed-Conditions

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Page 5

Notes Listing (all nodes)

Line#	Node Number	Notes
1	1P	Exfiltration Rate = 7.0 in./hr. (Merrimac-Urban Land = 100 micrometer per second = 14.17 in./hr. / 2 = 7.0 in/hr
2	PP#1	Exfiltration Rate = 7.0 in./hr. (Merrimac-Urban Land = 100 micrometer per second = 14.17 in./hr. / 2 = 7.0 in/hr
3	PP#2	Exfiltration Rate = 7.0 in./hr. (Merrimac-Urban Land = 100 micrometer per second = 14.17 in./hr. / 2 = 7.0 in/hr

2729-03_Proposed-Conditions

Type III 24-hr 2-Year Rainfall=3.23"

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Page 6

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: Subcat P-1	Runoff Area=4,358 sf 99.99% Impervious Runoff Depth=3.00" Tc=5.0 min CN=98 Runoff=0.33 cfs 1,089 cf
SubcatchmentP-2: Subcat P-2	Runoff Area=1,234 sf 87.57% Impervious Runoff Depth=2.29" Tc=5.0 min CN=91 Runoff=0.08 cfs 235 cf
SubcatchmentP-4: Subcat P-4	Runoff Area=972 sf 55.84% Impervious Runoff Depth=0.95" Tc=0.0 min CN=72 Runoff=0.03 cfs 77 cf
SubcatchmentP-5: Subcat P-5	Runoff Area=11,040 sf 100.00% Impervious Runoff Depth=3.00" Tc=5.0 min CN=98 Runoff=0.82 cfs 2,758 cf
SubcatchmentP3: Subcat P3	Runoff Area=1,324 sf 62.26% Impervious Runoff Depth=1.17" Tc=5.0 min CN=76 Runoff=0.04 cfs 129 cf
Reach SP1: Study Point 1	Inflow=0.08 cfs 235 cf Outflow=0.08 cfs 235 cf
Pond 1P: Infil. System	Peak Elev=30.70' Storage=674 cf Inflow=0.82 cfs 2,758 cf Discarded=0.14 cfs 2,759 cf Secondary=0.00 cfs 0 cf Outflow=0.14 cfs 2,759 cf
Pond PP#1: Pervious Pave #1	Peak Elev=34.30' Storage=149 cf Inflow=0.37 cfs 1,218 cf Discarded=0.13 cfs 1,219 cf Primary=0.00 cfs 0 cf Outflow=0.13 cfs 1,219 cf
Pond PP#2: Pervious Pave #1	Peak Elev=35.30' Storage=0 cf Inflow=0.03 cfs 77 cf Discarded=0.03 cfs 77 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 77 cf
Total Runoff Area = 18,929 sf Runoff Volume = 4,288 cf Average Runoff Depth = 2.72" 5.72% Pervious = 1,082 sf 94.28% Impervious = 17,846 sf	

2729-03_Proposed-Conditions

Type III 24-hr 2-Year Rainfall=3.23"

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Page 7

Summary for Subcatchment P-1: Subcat P-1

Runoff = 0.33 cfs @ 12.07 hrs, Volume= 1,089 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	39	>75% Grass cover, Good, HSG A
4,358	98	Roofs, HSG A
4,358	98	Weighted Average
0		0.01% Pervious Area
4,358		99.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 235 cf, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
1,081	98	Paved parking, HSG A
153	39	>75% Grass cover, Good, HSG A
1,234	91	Weighted Average
153		12.43% Pervious Area
1,081		87.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min tc

Summary for Subcatchment P-4: Subcat P-4

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 77 cf, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
543	98	Paved parking, HSG A
429	39	>75% Grass cover, Good, HSG A
972	72	Weighted Average
429		44.16% Pervious Area
543		55.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, min tc

Summary for Subcatchment P-5: Subcat P-5

Runoff = 0.82 cfs @ 12.07 hrs, Volume= 2,758 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.23"

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Type III 24-hr 2-Year Rainfall=3.23"

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Page 8

Area (sf)	CN	Description
10,685	98	Roofs, HSG A
355	98	Paved parking, HSG A
11,040	98	Weighted Average
11,040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, min tc

Summary for Subcatchment P3: Subcat P3

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 129 cf, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
500	39	>75% Grass cover, Good, HSG A
825	98	Paved parking, HSG A
1,324	76	Weighted Average
500		37.74% Pervious Area
825		62.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, min tc

Summary for Reach SP1: Study Point 1Inflow Area = 7,889 sf, 86.28% Impervious, Inflow Depth = 0.36" for 2-Year event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 235 cf
Outflow = 0.08 cfs @ 12.07 hrs, Volume= 235 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Infil. SystemInflow Area = 11,040 sf, 100.00% Impervious, Inflow Depth = 3.00" for 2-Year event
Inflow = 0.82 cfs @ 12.07 hrs, Volume= 2,758 cf
Outflow = 0.14 cfs @ 11.80 hrs, Volume= 2,759 cf, Atten= 83%, Lag= 0.0 min
Discarded = 0.14 cfs @ 11.80 hrs, Volume= 2,759 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 30.70' @ 12.51 hrs Surf.Area= 885 sf Storage= 674 cf

Flood Elev= 37.00' Surf.Area= 885 sf Storage= 3,172 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 24.0 min (779.3 - 755.3)

Volume	Invert	Avail. Storage	Storage Description
#1A	29.00'	1,573 cf	15.83'W x 55.89'L x 6.25'H Field A 5,531 cf Overall - 1,599 cf Embedded = 3,932 cf x 40.0% Voids
#2A	30.50'	1,599 cf	ADS StormTech MC-3500 d +Cap x 14 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 14 Chambers in 2 Rows Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
		3,172 cf	Total Available Storage

Storage Group A created with Chamber Wizard

2729-03_Proposed-Conditions

Type III 24-hr 2-Year Rainfall=3.23"

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Page 9

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.00'	7.000 in/hr Exfiltration over Surface area
#2	Secondary	36.00'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.14 cfs @ 11.80 hrs HW=29.09' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=29.00' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond PP#1: Pervious Pave #1**

Inflow Area = 5,683 sf, 91.20% Impervious, Inflow Depth = 2.57" for 2-Year event
 Inflow = 0.37 cfs @ 12.07 hrs, Volume= 1,218 cf
 Outflow = 0.13 cfs @ 12.32 hrs, Volume= 1,219 cf, Atten= 65%, Lag= 14.9 min
 Discarded = 0.13 cfs @ 12.32 hrs, Volume= 1,219 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 34.30' @ 12.32 hrs Surf.Area= 753 sf Storage= 149 cf

Flood Elev= 37.00' Surf.Area= 753 sf Storage= 904 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 4.6 min (770.4 - 765.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.80'	904 cf	Subbase (Conic) Listed below (Recalc) 2,259 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
33.80	753	0	0	753
36.80	753	2,259	2,259	1,045

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.80'	7.000 in/hr Exfiltration over Wetted area
#2	Primary	36.80'	4.5' long x 3.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.13 cfs @ 12.32 hrs HW=34.30' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.13 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=33.80' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond PP#2: Pervious Pave #1**

Inflow Area = 972 sf, 55.84% Impervious, Inflow Depth = 0.95" for 2-Year event
 Inflow = 0.03 cfs @ 12.00 hrs, Volume= 77 cf
 Outflow = 0.03 cfs @ 12.00 hrs, Volume= 77 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.03 cfs @ 12.00 hrs, Volume= 77 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 35.30' @ 0.00 hrs Surf.Area= 546 sf Storage= 0 cf

Flood Elev= 37.00' Surf.Area= 546 sf Storage= 328 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (862.6 - 862.6)

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Type III 24-hr 2-Year Rainfall=3.23"

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Page 10

Volume	Invert	Avail.Storage	Storage Description
#1	35.30'	328 cf	Subbase (Conic) Listed below (Recalc) 819 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.30	546	0	0	546
36.80	546	819	819	670

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.30'	7.000 in/hr Exfiltration over Wetted area
#2	Primary	36.80'	4.5' long x 3.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 12.00 hrs HW=35.30' (Free Discharge)↑**1=Exfiltration** (Passes 0.00 cfs of 0.09 cfs potential flow)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=35.30' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

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Type III 24-hr 10-Year Rainfall=4.90"

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Page 11

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: Subcat P-1Runoff Area=4,358 sf 99.99% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=98 Runoff=0.50 cfs 1,694 cf**SubcatchmentP-2: Subcat P-2**Runoff Area=1,234 sf 87.57% Impervious Runoff Depth=3.89"
Tc=5.0 min CN=91 Runoff=0.13 cfs 400 cf**SubcatchmentP-4: Subcat P-4**Runoff Area=972 sf 55.84% Impervious Runoff Depth=2.12"
Tc=0.0 min CN=72 Runoff=0.07 cfs 172 cf**SubcatchmentP-5: Subcat P-5**Runoff Area=11,040 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=98 Runoff=1.26 cfs 4,290 cf**SubcatchmentP3: Subcat P3**Runoff Area=1,324 sf 62.26% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=76 Runoff=0.09 cfs 271 cf**Reach SP1: Study Point 1**Inflow=0.13 cfs 400 cf
Outflow=0.13 cfs 400 cf**Pond 1P: Infil. System**Peak Elev=31.58' Storage=1,292 cf Inflow=1.26 cfs 4,290 cf
Discarded=0.14 cfs 4,291 cf Secondary=0.00 cfs 0 cf Outflow=0.14 cfs 4,291 cf**Pond PP#1: Pervious Pave #1**Peak Elev=35.10' Storage=391 cf Inflow=0.59 cfs 1,964 cf
Discarded=0.14 cfs 1,966 cf Primary=0.00 cfs 0 cf Outflow=0.14 cfs 1,966 cf**Pond PP#2: Pervious Pave #1**Peak Elev=35.30' Storage=0 cf Inflow=0.07 cfs 172 cf
Discarded=0.07 cfs 172 cf Primary=0.00 cfs 0 cf Outflow=0.07 cfs 172 cf**Total Runoff Area = 18,929 sf Runoff Volume = 6,826 cf Average Runoff Depth = 4.33"**
5.72% Pervious = 1,082 sf 94.28% Impervious = 17,846 sf

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Type III 24-hr 10-Year Rainfall=4.90"

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Page 12

Summary for Subcatchment P-1: Subcat P-1

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 1,694 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	39	>75% Grass cover, Good, HSG A
4,358	98	Roofs, HSG A
4,358	98	Weighted Average
0		0.01% Pervious Area
4,358		99.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 400 cf, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
1,081	98	Paved parking, HSG A
153	39	>75% Grass cover, Good, HSG A
1,234	91	Weighted Average
153		12.43% Pervious Area
1,081		87.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min tc

Summary for Subcatchment P-4: Subcat P-4

Runoff = 0.07 cfs @ 12.00 hrs, Volume= 172 cf, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
543	98	Paved parking, HSG A
429	39	>75% Grass cover, Good, HSG A
972	72	Weighted Average
429		44.16% Pervious Area
543		55.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, min tc

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.26 cfs @ 12.07 hrs, Volume= 4,290 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.90"

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Type III 24-hr 10-Year Rainfall=4.90"

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Page 13

Area (sf)	CN	Description
10,685	98	Roofs, HSG A
355	98	Paved parking, HSG A
11,040	98	Weighted Average
11,040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, min tc

Summary for Subcatchment P3: Subcat P3

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 271 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
500	39	>75% Grass cover, Good, HSG A
825	98	Paved parking, HSG A
1,324	76	Weighted Average
500		37.74% Pervious Area
825		62.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, min tc

Summary for Reach SP1: Study Point 1Inflow Area = 7,889 sf, 86.28% Impervious, Inflow Depth = 0.61" for 10-Year event
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 400 cf
Outflow = 0.13 cfs @ 12.07 hrs, Volume= 400 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Infil. SystemInflow Area = 11,040 sf, 100.00% Impervious, Inflow Depth = 4.66" for 10-Year event
Inflow = 1.26 cfs @ 12.07 hrs, Volume= 4,290 cf
Outflow = 0.14 cfs @ 11.69 hrs, Volume= 4,291 cf, Atten= 89%, Lag= 0.0 min
Discarded = 0.14 cfs @ 11.69 hrs, Volume= 4,291 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 31.58' @ 12.64 hrs Surf.Area= 885 sf Storage= 1,292 cf

Flood Elev= 37.00' Surf.Area= 885 sf Storage= 3,172 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 54.6 min (802.0 - 747.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	29.00'	1,573 cf	15.83'W x 55.89'L x 6.25'H Field A 5,531 cf Overall - 1,599 cf Embedded = 3,932 cf x 40.0% Voids
#2A	30.50'	1,599 cf	ADS StormTech MC-3500 d +Cap x 14 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 14 Chambers in 2 Rows Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
		3,172 cf	Total Available Storage

Storage Group A created with Chamber Wizard

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Type III 24-hr 10-Year Rainfall=4.90"

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Page 14

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.00'	7.000 in/hr Exfiltration over Surface area
#2	Secondary	36.00'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.14 cfs @ 11.69 hrs HW=29.08' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=29.00' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond PP#1: Pervious Pave #1**

Inflow Area = 5,683 sf, 91.20% Impervious, Inflow Depth = 4.15" for 10-Year event
 Inflow = 0.59 cfs @ 12.07 hrs, Volume= 1,964 cf
 Outflow = 0.14 cfs @ 12.44 hrs, Volume= 1,966 cf, Atten= 76%, Lag= 22.3 min
 Discarded = 0.14 cfs @ 12.44 hrs, Volume= 1,966 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 35.10' @ 12.44 hrs Surf.Area= 753 sf Storage= 391 cf

Flood Elev= 37.00' Surf.Area= 753 sf Storage= 904 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 13.3 min (772.4 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1	33.80'	904 cf	Subbase (Conic) Listed below (Recalc) 2,259 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
33.80	753	0	0	753
36.80	753	2,259	2,259	1,045

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.80'	7.000 in/hr Exfiltration over Wetted area
#2	Primary	36.80'	4.5' long x 3.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.14 cfs @ 12.44 hrs HW=35.10' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=33.80' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond PP#2: Pervious Pave #1**

Inflow Area = 972 sf, 55.84% Impervious, Inflow Depth = 2.12" for 10-Year event
 Inflow = 0.07 cfs @ 12.00 hrs, Volume= 172 cf
 Outflow = 0.07 cfs @ 12.00 hrs, Volume= 172 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.07 cfs @ 12.00 hrs, Volume= 172 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 35.30' @ 12.00 hrs Surf.Area= 546 sf Storage= 0 cf

Flood Elev= 37.00' Surf.Area= 546 sf Storage= 328 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (838.0 - 838.0)

2729-03_Proposed-Conditions

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Type III 24-hr 10-Year Rainfall=4.90"

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Page 15

Volume	Invert	Avail.Storage	Storage Description
#1	35.30'	328 cf	Subbase (Conic) Listed below (Recalc) 819 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.30	546	0	0	546
36.80	546	819	819	670

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.30'	7.000 in/hr Exfiltration over Wetted area
#2	Primary	36.80'	4.5' long x 3.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.09 cfs @ 12.00 hrs HW=35.30' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.09 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=35.30' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

2729-03_Proposed-Conditions

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Type III 24-hr 100-Year Rainfall=8.89"

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Page 16

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: Subcat P-1

Runoff Area=4,358 sf 99.99% Impervious Runoff Depth=8.65"
Tc=5.0 min CN=98 Runoff=0.91 cfs 3,142 cf

SubcatchmentP-2: Subcat P-2

Runoff Area=1,234 sf 87.57% Impervious Runoff Depth=7.80"
Tc=5.0 min CN=91 Runoff=0.25 cfs 803 cf

SubcatchmentP-4: Subcat P-4

Runoff Area=972 sf 55.84% Impervious Runoff Depth=5.48"
Tc=0.0 min CN=72 Runoff=0.18 cfs 444 cf

SubcatchmentP-5: Subcat P-5

Runoff Area=11,040 sf 100.00% Impervious Runoff Depth=8.65"
Tc=5.0 min CN=98 Runoff=2.29 cfs 7,958 cf

SubcatchmentP3: Subcat P3

Runoff Area=1,324 sf 62.26% Impervious Runoff Depth=5.97"
Tc=5.0 min CN=76 Runoff=0.22 cfs 659 cf

Reach SP1: Study Point 1

Inflow=0.50 cfs 975 cf
Outflow=0.50 cfs 975 cf

Pond 1P: Infil. System

Peak Elev=34.98' Storage=3,078 cf Inflow=2.29 cfs 7,958 cf
Discarded=0.14 cfs 7,958 cf Secondary=0.00 cfs 0 cf Outflow=0.14 cfs 7,958 cf

Pond PP#1: Pervious Pave #1

Peak Elev=36.91' Storage=904 cf Inflow=1.12 cfs 3,801 cf
Discarded=0.17 cfs 3,629 cf Primary=0.40 cfs 172 cf Outflow=0.57 cfs 3,801 cf

Pond PP#2: Pervious Pave #1

Peak Elev=35.42' Storage=26 cf Inflow=0.18 cfs 444 cf
Discarded=0.09 cfs 444 cf Primary=0.00 cfs 0 cf Outflow=0.09 cfs 444 cf

Total Runoff Area = 18,929 sf Runoff Volume = 13,005 cf Average Runoff Depth = 8.24"
5.72% Pervious = 1,082 sf 94.28% Impervious = 17,846 sf

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Type III 24-hr 100-Year Rainfall=8.89"

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Page 17

Summary for Subcatchment P-1: Subcat P-1

Runoff = 0.91 cfs @ 12.07 hrs, Volume= 3,142 cf, Depth= 8.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	39	>75% Grass cover, Good, HSG A
4,358	98	Roofs, HSG A
4,358	98	Weighted Average
0		0.01% Pervious Area
4,358		99.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 803 cf, Depth= 7.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
1,081	98	Paved parking, HSG A
153	39	>75% Grass cover, Good, HSG A
1,234	91	Weighted Average
153		12.43% Pervious Area
1,081		87.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min tc

Summary for Subcatchment P-4: Subcat P-4

Runoff = 0.18 cfs @ 12.00 hrs, Volume= 444 cf, Depth= 5.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
543	98	Paved parking, HSG A
429	39	>75% Grass cover, Good, HSG A
972	72	Weighted Average
429		44.16% Pervious Area
543		55.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, min tc

Summary for Subcatchment P-5: Subcat P-5

Runoff = 2.29 cfs @ 12.07 hrs, Volume= 7,958 cf, Depth= 8.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=8.89"

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Type III 24-hr 100-Year Rainfall=8.89"

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Page 18

Area (sf)	CN	Description
10,685	98	Roofs, HSG A
355	98	Paved parking, HSG A
11,040	98	Weighted Average
11,040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, min tc

Summary for Subcatchment P3: Subcat P3

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 659 cf, Depth= 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
500	39	>75% Grass cover, Good, HSG A
825	98	Paved parking, HSG A
1,324	76	Weighted Average
500		37.74% Pervious Area
825		62.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, min tc

Summary for Reach SP1: Study Point 1

Inflow Area = 7,889 sf, 86.28% Impervious, Inflow Depth = 1.48" for 100-Year event

Inflow = 0.50 cfs @ 12.24 hrs, Volume= 975 cf

Outflow = 0.50 cfs @ 12.24 hrs, Volume= 975 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Infil. System

Inflow Area = 11,040 sf, 100.00% Impervious, Inflow Depth = 8.65" for 100-Year event

Inflow = 2.29 cfs @ 12.07 hrs, Volume= 7,958 cf

Outflow = 0.14 cfs @ 11.19 hrs, Volume= 7,958 cf, Atten= 94%, Lag= 0.0 min

Discarded = 0.14 cfs @ 11.19 hrs, Volume= 7,958 cf

Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 34.98' @ 13.49 hrs Surf.Area= 885 sf Storage= 3,078 cf

Flood Elev= 37.00' Surf.Area= 885 sf Storage= 3,172 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 159.1 min (898.1 - 739.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	29.00'	1,573 cf	15.83'W x 55.89'L x 6.25'H Field A 5,531 cf Overall - 1,599 cf Embedded = 3,932 cf x 40.0% Voids
#2A	30.50'	1,599 cf	ADS_StormTech MC-3500 d +Cap x 14 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 14 Chambers in 2 Rows Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
		3,172 cf	Total Available Storage

Storage Group A created with Chamber Wizard

2729-03_Proposed-Conditions

Type III 24-hr 100-Year Rainfall=8.89"

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Page 19

Device	Routing	Invert	Outlet Devices
#1	Discarded	29.00'	7.000 in/hr Exfiltration over Surface area
#2	Secondary	36.00'	5.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.14 cfs @ 11.19 hrs HW=29.08' (Free Discharge)↳ **1=Exfiltration** (Exfiltration Controls 0.14 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=29.00' TW=0.00' (Dynamic Tailwater)↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond PP#1: Pervious Pave #1**

Inflow Area = 5,683 sf, 91.20% Impervious, Inflow Depth = 8.03" for 100-Year event
 Inflow = 1.12 cfs @ 12.07 hrs, Volume= 3,801 cf
 Outflow = 0.57 cfs @ 12.24 hrs, Volume= 3,801 cf, Atten= 50%, Lag= 10.3 min
 Discarded = 0.17 cfs @ 12.24 hrs, Volume= 3,629 cf
 Primary = 0.40 cfs @ 12.24 hrs, Volume= 172 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 36.91' @ 12.24 hrs Surf.Area= 753 sf Storage= 904 cf

Flood Elev= 37.00' Surf.Area= 753 sf Storage= 904 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 30.9 min (781.7 - 750.8)

Volume	Invert	Avail.Storage	Storage Description	
#1	33.80'	904 cf	Subbase (Conic) Listed below (Recalc) 2,259 cf Overall x 40.0% Voids	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
33.80	753	0	0	753
36.80	753	2,259	2,259	1,045

Device	Routing	Invert	Outlet Devices
#1	Discarded	33.80'	7.000 in/hr Exfiltration over Wetted area
#2	Primary	36.80'	4.5' long x 3.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.17 cfs @ 12.24 hrs HW=36.91' (Free Discharge)↳ **1=Exfiltration** (Exfiltration Controls 0.17 cfs)**Primary OutFlow** Max=0.35 cfs @ 12.24 hrs HW=36.90' TW=0.00' (Dynamic Tailwater)↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.35 cfs @ 0.77 fps)**Summary for Pond PP#2: Pervious Pave #1**

Inflow Area = 972 sf, 55.84% Impervious, Inflow Depth = 5.48" for 100-Year event
 Inflow = 0.18 cfs @ 12.00 hrs, Volume= 444 cf
 Outflow = 0.09 cfs @ 12.09 hrs, Volume= 444 cf, Atten= 49%, Lag= 5.1 min
 Discarded = 0.09 cfs @ 12.09 hrs, Volume= 444 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 35.42' @ 12.09 hrs Surf.Area= 546 sf Storage= 26 cf

Flood Elev= 37.00' Surf.Area= 546 sf Storage= 328 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.9 min (811.4 - 810.6)

2729-03_Proposed-Conditions

Type III 24-hr 100-Year Rainfall=8.89"

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Page 20

Volume	Invert	Avail.Storage	Storage Description
#1	35.30'	328 cf	Subbase (Conic) Listed below (Recalc) 819 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.30	546	0	0	546
36.80	546	819	819	670

Device	Routing	Invert	Outlet Devices
#1	Discarded	35.30'	7.000 in/hr Exfiltration over Wetted area
#2	Primary	36.80'	4.5' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.09 cfs @ 12.09 hrs HW=35.42' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.09 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=35.30' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.142 degrees West
Latitude	42.405 degrees North
Elevation	0 feet
Date/Time	Fri, 28 Aug 2020 14:10:00 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min	1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	0.75	1.04	1.28	1.63	2.09	2.69	2.94	1yr	2.38	2.83	3.29	3.98	4.65	1yr
2yr	0.35	0.54	0.67	0.88	1.11	1.40	0.96	1.28	1.62	2.04	2.57	3.23	3.59	2yr	2.86	3.45	3.95	4.70	5.35	2yr
5yr	0.42	0.65	0.81	1.09	1.39	1.77	1.20	1.61	2.06	2.60	3.26	4.09	4.56	5yr	3.62	4.38	5.00	5.97	6.69	5yr
10yr	0.47	0.74	0.93	1.27	1.65	2.12	1.42	1.91	2.47	3.12	3.92	4.90	5.47	10yr	4.33	5.26	5.99	7.15	7.92	10yr
25yr	0.56	0.89	1.13	1.56	2.06	2.67	1.78	2.40	3.13	3.96	4.98	6.20	6.96	25yr	5.49	6.69	7.59	9.10	9.91	25yr
50yr	0.63	1.01	1.30	1.82	2.45	3.21	2.12	2.86	3.77	4.78	5.98	7.43	8.36	50yr	6.57	8.03	9.08	10.92	11.75	50yr
100yr	0.73	1.18	1.52	2.14	2.92	3.84	2.52	3.40	4.52	5.73	7.17	8.89	10.04	100yr	7.87	9.65	10.88	13.10	13.94	100yr
200yr	0.83	1.36	1.76	2.52	3.47	4.60	2.99	4.05	5.43	6.89	8.61	10.65	12.07	200yr	9.43	11.60	13.03	15.73	16.54	200yr
500yr	1.01	1.65	2.16	3.13	4.37	5.83	3.77	5.11	6.90	8.77	10.97	13.54	15.40	500yr	11.98	14.81	16.55	20.05	20.75	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min	1hr	2hr	3hr	6hr	12hr	24hr	48hr	1day	2day	4day	7day	10day	
1yr	0.25	0.38	0.46	0.62	0.76	0.85	0.66	0.83	1.15	1.44	1.78	2.44	2.50	2.16	2.41	2.93	3.53	4.05	1yr
2yr	0.33	0.51	0.63	0.85	1.05	1.26	0.91	1.23	1.45	1.91	2.48	3.13	3.47	2.77	3.33	3.82	4.53	5.18	2yr
5yr	0.39	0.60	0.75	1.02	1.30	1.51	1.12	1.47	1.73	2.24	2.89	3.77	4.18	3.34	4.02	4.59	5.47	6.17	5yr
10yr	0.44	0.67	0.83	1.16	1.50	1.73	1.29	1.69	1.95	2.53	3.24	4.35	4.83	3.85	4.65	5.27	6.29	7.01	10yr

	5min	10min	15min	30min	60min	120min	1hr	2hr	3hr	6hr	12hr	24hr	48hr	1day	2day	4day	7day	10day	
25yr	0.50	0.77	0.95	1.36	1.79	2.05	1.54	2.00	2.31	2.96	3.78	5.23	5.82	4.63	5.60	6.31	7.52	8.29	25yr
50yr	0.56	0.85	1.06	1.52	2.05	2.35	1.77	2.30	2.61	3.34	4.24	5.99	6.70	5.30	6.44	7.22	8.60	9.39	50yr
100yr	0.63	0.95	1.18	1.71	2.35	2.68	2.03	2.62	2.96	3.62	4.77	6.89	7.70	6.10	7.41	8.27	9.79	10.65	100yr
200yr	0.70	1.06	1.34	1.94	2.71	3.06	2.34	2.99	3.36	4.05	5.37	7.91	8.86	7.00	8.52	9.46	11.12	12.03	200yr
500yr	0.82	1.23	1.58	2.29	3.26	3.65	2.81	3.57	3.97	4.70	6.29	9.50	10.64	8.41	10.23	11.30	13.12	14.12	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min	1hr	2hr	3hr	6hr	12hr	24hr	48hr	1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.79	0.97	1.13	0.83	1.11	1.32	1.77	2.25	2.86	3.17	2.53	3.05	3.51	4.29	5.03	1yr
2yr	0.36	0.56	0.69	0.94	1.15	1.36	1.00	1.33	1.57	2.08	2.68	3.35	3.74	2.97	3.59	4.11	4.89	5.55	2yr
5yr	0.45	0.70	0.86	1.19	1.51	1.79	1.30	1.75	2.05	2.66	3.39	4.44	5.00	3.93	4.81	5.43	6.48	7.21	5yr
10yr	0.55	0.84	1.05	1.46	1.89	2.20	1.63	2.15	2.55	3.22	4.07	5.51	6.25	4.88	6.01	6.72	8.04	8.83	10yr
25yr	0.71	1.08	1.35	1.92	2.53	2.90	2.19	2.83	3.39	4.16	5.17	7.32	8.42	6.48	8.09	8.92	10.74	11.56	25yr
50yr	0.86	1.31	1.64	2.35	3.17	3.59	2.73	3.51	4.21	5.05	6.22	9.08	10.54	8.04	10.14	11.04	13.40	14.18	50yr
100yr	1.06	1.60	2.00	2.89	3.96	4.42	3.42	4.32	5.22	6.37	7.47	11.28	13.22	9.98	12.71	13.68	16.75	17.43	100yr
200yr	1.29	1.94	2.45	3.55	4.95	5.46	4.27	5.34	6.49	7.78	8.96	14.02	16.60	12.41	15.96	16.97	20.95	21.46	200yr
500yr	1.68	2.50	3.21	4.67	6.63	7.20	5.72	7.04	8.66	10.14	11.41	18.71	22.44	16.56	21.58	22.57	28.20	28.29	500yr



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Middlesex County, Massachusetts**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface.....	2
How Soil Surveys Are Made.....	5
Soil Map.....	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Middlesex County, Massachusetts.....	13
253D—Hinckley loamy sand, 15 to 25 percent slopes.....	13
420B—Canton fine sandy loam, 3 to 8 percent slopes.....	14
602—Urban land.....	16
626B—Merrimac-Urban land complex, 0 to 8 percent slopes.....	17
631C—Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky.....	19
654—Udorthents, loamy.....	21
655—Udorthents, wet substratum.....	22
Soil Information for All Uses.....	24
Soil Properties and Qualities.....	24
Soil Physical Properties.....	24
Saturated Hydraulic Conductivity (Ksat).....	24
Soil Qualities and Features.....	27
Hydrologic Soil Group.....	28
References.....	32

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

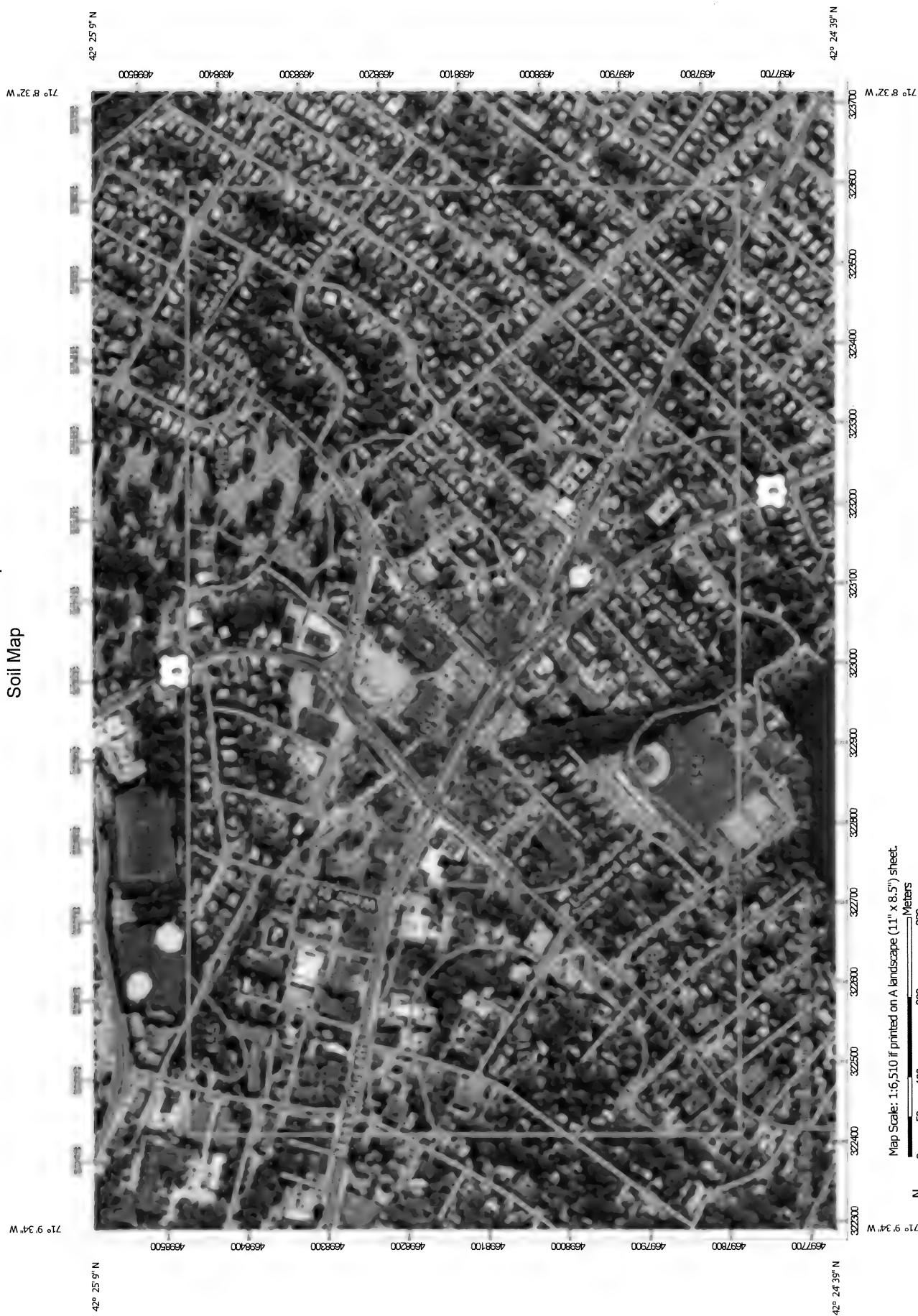
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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MAP LEGEND

- Area of Interest (AOI)

Area of Interest (AOI)
- Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points
- Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot
- Water Features

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Streams and Canals

Streams and Canals
- Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads
- Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 13, 2020—Sep 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
253D	Hinckley loamy sand, 15 to 25 percent slopes	0.1	0.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	2.8	1.4%
602	Urban land	97.4	48.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	80.9	40.2%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	14.2	7.0%
654	Udorthents, loamy	4.7	2.3%
655	Udorthents, wet substratum	1.4	0.7%
Totals for Area of Interest		201.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

Custom Soil Resource Report

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

253D—Hinckley loamy sand, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2svmc

Elevation: 0 to 1,460 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash terraces, outwash deltas, kame terraces, kames, outwash plains, eskers, moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser

Down-slope shape: Linear, concave, convex

Across-slope shape: Convex, linear, concave

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A

Custom Soil Resource Report

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 8 percent

Landform: Kames, outwash terraces, eskers, moraines, outwash plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Windsor

Percent of map unit: 5 percent

Landform: Outwash deltas, eskers, moraines, kame terraces, kames, outwash plains, outwash terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser

Down-slope shape: Convex, concave, linear

Across-slope shape: Concave, linear, convex

Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent

Landform: Outwash plains, moraines, outwash deltas, kame terraces, eskers, outwash terraces

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Concave, linear, convex

Across-slope shape: Linear, concave, convex

Hydric soil rating: No

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w81b

Elevation: 0 to 1,180 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Canton and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Description of Canton

Setting

Landform: Ridges, moraines, hills

Landform position (two-dimensional): Backslope, summit, shoulder

Landform position (three-dimensional): Side slope, crest, nose slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam

Bw1 - 7 to 15 inches: fine sandy loam

Bw2 - 15 to 26 inches: gravelly fine sandy loam

2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 10 percent

Landform: Drumlins, hills, ground moraines

Landform position (two-dimensional): Footslope, backslope, summit

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Montauk

Percent of map unit: 5 percent

Landform: Drumlins, hills, ground moraines, moraines

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Custom Soil Resource Report

Charlton

Percent of map unit: 4 percent
Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Kettles, swamps, bogs, depressions, marshes
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

602—Urban land

Map Unit Setting

National map unit symbol: 9950
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Custom Soil Resource Report

Udorthents, wet substratum

Percent of map unit: 5 percent

Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent

Hydric soil rating: No

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9

Elevation: 0 to 820 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent

Urban land: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, moraines, outwash terraces, outwash plains, kames

Landform position (two-dimensional): Backslope, footslope, summit, shoulder

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam

Bw1 - 10 to 22 inches: fine sandy loam

Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand

2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Windsor

Percent of map unit: 5 percent
Landform: Dunes, outwash terraces, deltas, outwash plains
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, kames, deltas, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise

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Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

631C—Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky

Map Unit Setting

National map unit symbol: vr1g
Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent
Urban land: 35 percent
Hollis and similar soils: 10 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Drumlins, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 22 inches: sandy loam
H3 - 22 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.3 inches)

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Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Description of Hollis

Setting

Landform: Ridges, hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 14 inches: fine sandy loam
H3 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Canton

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Side slope, base slope

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 2 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Scituate

Percent of map unit: 1 percent
Landform: Depressions, hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Montauk

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

654—Udorthents, loamy

Map Unit Setting

National map unit symbol: vr11
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Udorthents, Loamy

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Minor Components

Udorthents, sandy

Percent of map unit: 10 percent

Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent

Hydric soil rating: Yes

Urban land

Percent of map unit: 5 percent

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

655—Udorthents, wet substratum

Map Unit Setting

National map unit symbol: vr1n

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 110 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Minor Components

Urban land

Percent of map unit: 8 percent

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Freetown

Percent of map unit: 4 percent

Landform: Depressions, bogs

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent

Landform: Bogs, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

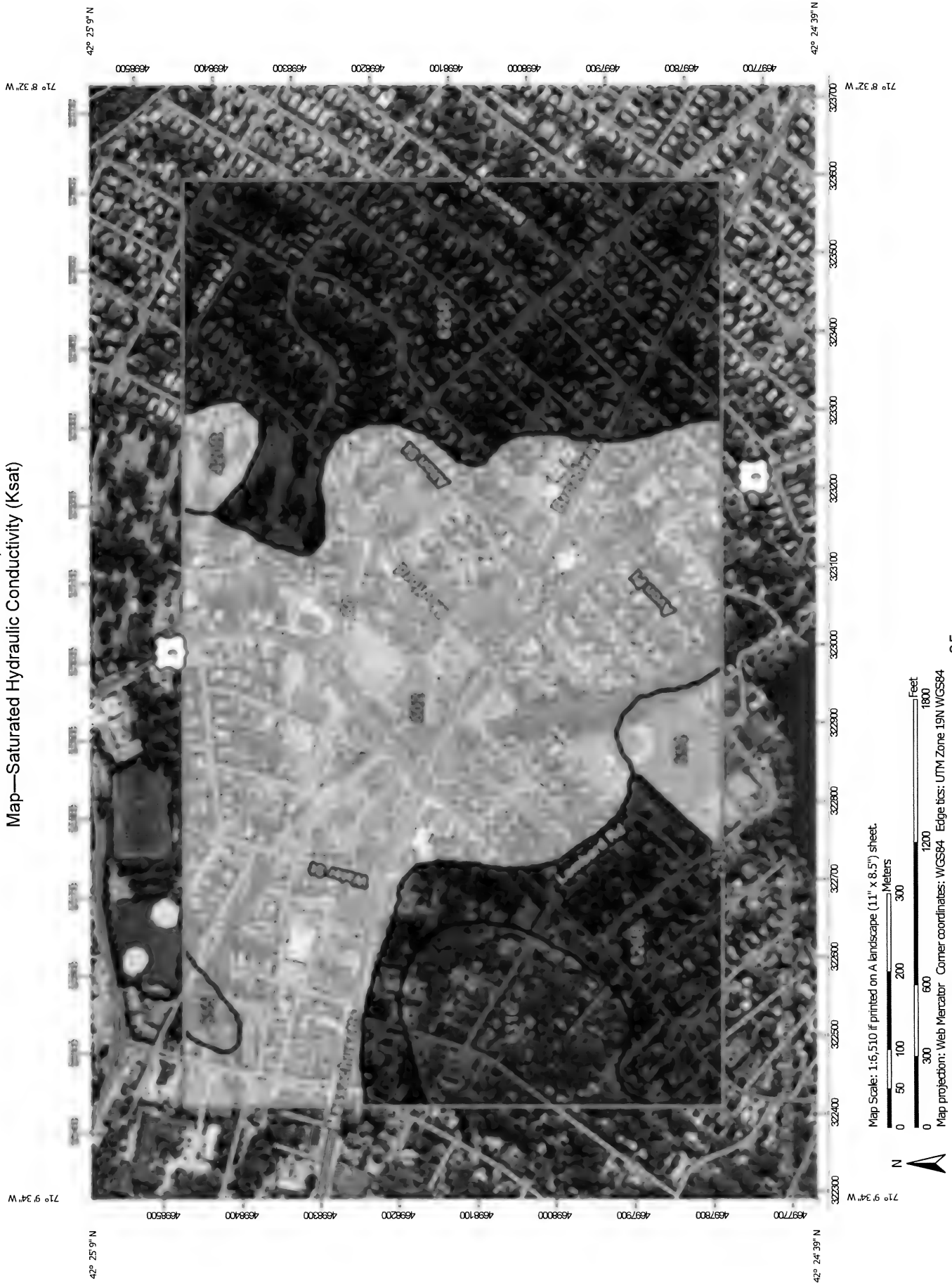
Saturated Hydraulic Conductivity (Ksat)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Custom Soil Resource Report Map—Saturated Hydraulic Conductivity (Ksat)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Background

Aerial Photography

Soils

Soil Rating Polygons

<= 23.2900

> 23.2900 and <= 54.0000

> 54.0000 and <= 100.0000

Not rated or not available

Soil Rating Lines

<= 23.2900

> 23.2900 and <= 54.0000

> 54.0000 and <= 100.0000

Not rated or not available

Soil Rating Points

<= 23.2900

> 23.2900 and <= 54.0000

> 54.0000 and <= 100.0000

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 13, 2020—Sep 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
253D	Hinckley loamy sand, 15 to 25 percent slopes	100.0000	0.1	0.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	54.0000	2.8	1.4%
602	Urban land		97.4	48.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	100.0000	80.9	40.2%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	23.2900	14.2	7.0%
654	Udorthents, loamy		4.7	2.3%
655	Udorthents, wet substratum		1.4	0.7%
Totals for Area of Interest			201.4	100.0%

Rating Options—Saturated Hydraulic Conductivity (Ksat)*Units of Measure:* micrometers per second*Aggregation Method:* Dominant Component*Component Percent Cutoff:* None Specified*Tie-break Rule:* Fastest*Interpret Nulls as Zero:* No*Layer Options (Horizon Aggregation Method):* Depth Range (Weighted Average)*Top Depth:* 12*Bottom Depth:* 120*Units of Measure:* Inches**Soil Qualities and Features**

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

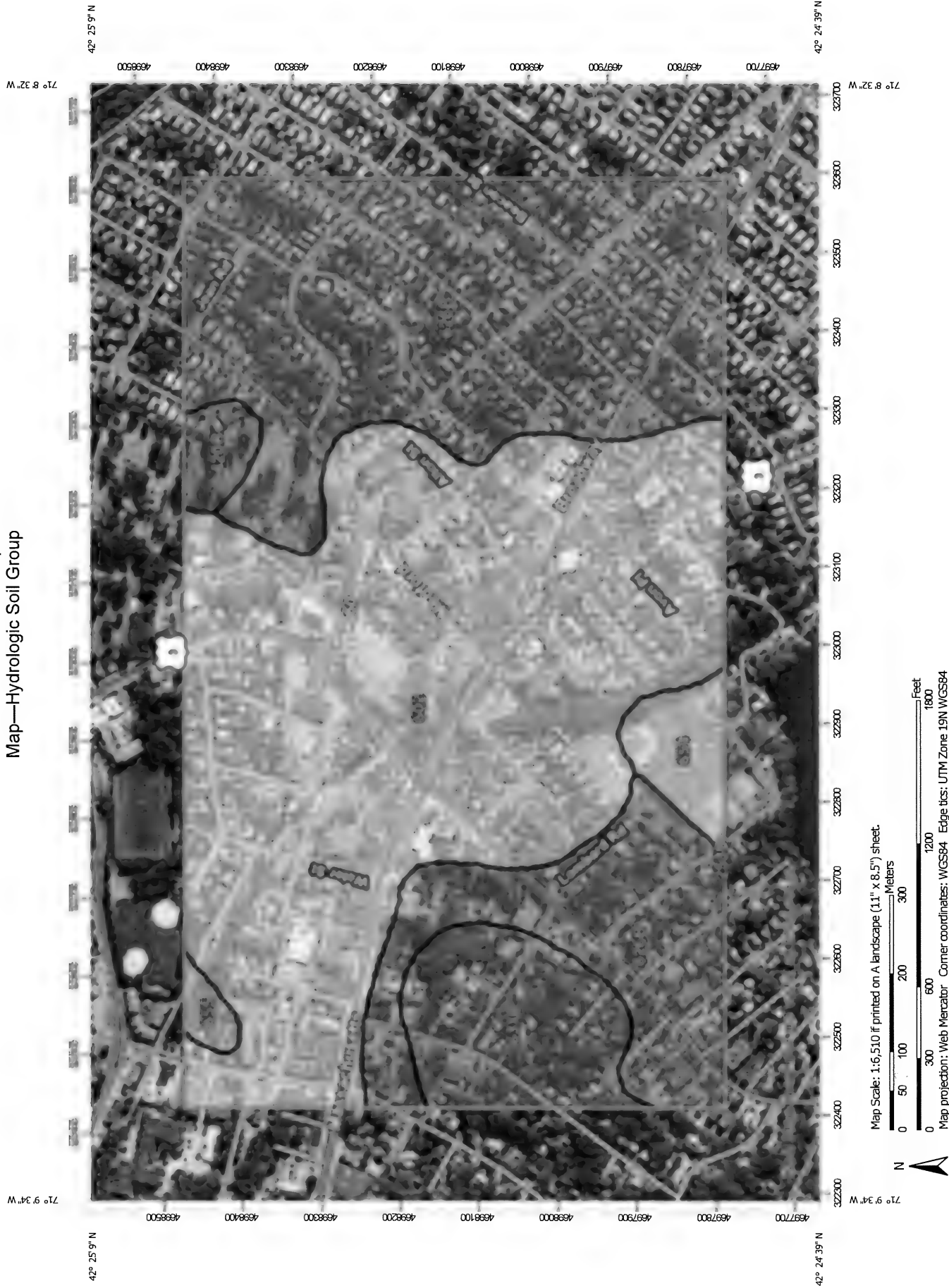
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report Map—Hydrologic Soil Group



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

C

C/D

D

Not rated or not available

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 13, 2020—Sep 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
253D	Hinckley loamy sand, 15 to 25 percent slopes	A	0.1	0.0%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	2.8	1.4%
602	Urban land		97.4	48.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	80.9	40.2%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	A	14.2	7.0%
654	Udorthents, loamy		4.7	2.3%
655	Udorthents, wet substratum		1.4	0.7%
Totals for Area of Interest			201.4	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

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Custom Soil Resource Report

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LOCUS MAP
NOT TO SCALE

APPLICANT:
2-14 MEDFORD STREET, LLC
455 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

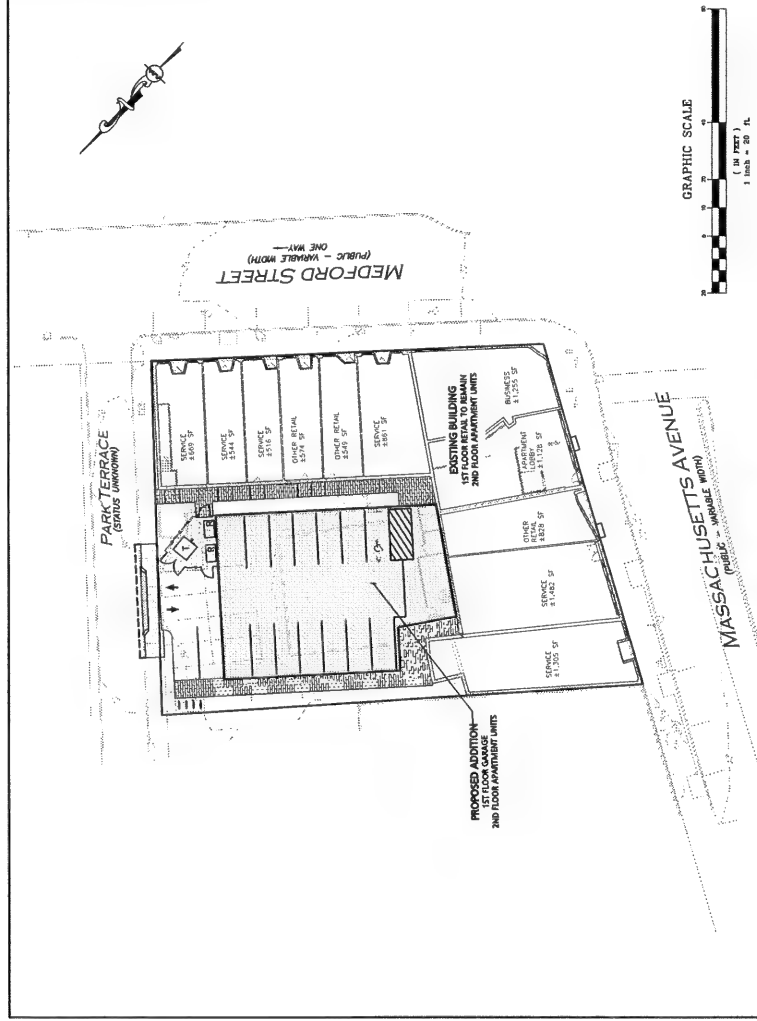
ARCHITECT:
MARKET SQUARE ARCHITECTS
104 CONGRESS STREET, STE 203
PORTSMOUTH, NH 03801
(603) 501-0202

**CIVIL ENGINEER, LANDSCAPE ARCHITECT &
LAND SURVEYOR:**
ALLEN & MAJOR ASSOCIATES, INC.
100 COMMERCE WAY, SUITE 5
WOBBURN, MA 01801
(781) 985-6889

SITE DEVELOPMENT PLAN SET

455-457 MASSACHUSETTS AVENUE

ARLINGTON, MA 02476



LIST OF DRAWINGS			
DRAWING TITLE	SHEET	ISSUED	REVISED
EXISTING CONDITIONS	1	8/19/2021	-
SITE PREPARATION PLAN	C-101	8/20/2021	-
LAYOUT & MATERIALS PLAN	C-102	8/20/2021	-
GRADING & DRAINAGE PLAN	C-103	8/20/2021	-
DETAILS	C-501	8/20/2021	-
LANDSCAPE PLAN	C-502	8/20/2021	-
LANDSCAPE DETAILS	L-501	8/20/2021	-



8/20/21

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.



**ALLEN & MAJOR
ASSOCIATES, INC.**
civil engineering • landscape architecture
100 COMMERCE WAY, SUITE 5
WOBBURN, MA 01801
TEL: (781) 985-6889
FAX: (781) 985-6890

WOBBURN, MA • LAKESIDE, MA • HANCOCK, MA

ISSUED FOR ARB REVIEW: 8/20/2021

PROJECTS 1729-03 CIVIL LDMWST CURRENT C-279-OL COVERING

I HEREBY CERTIFY THAT THIS PLAN IS THE
 RESULT OF AN ACTUAL SURVEY OF THE GROUND
 AND WAS PREPARED BY ME OR UNDER MY
 SUPERVISION AND I AM A LICENSED PROFESSIONAL ENGINEER
 IN THE STATE OF MASSACHUSETTS.
 NOVEMBER 18, 2020 AND NOVEMBER 18,
 2022

Allen & Major Associates, Inc.
 PROFESSIONAL LAND SURVEYOR FOR
 ALLEN & MAJOR ASSOCIATES, INC.

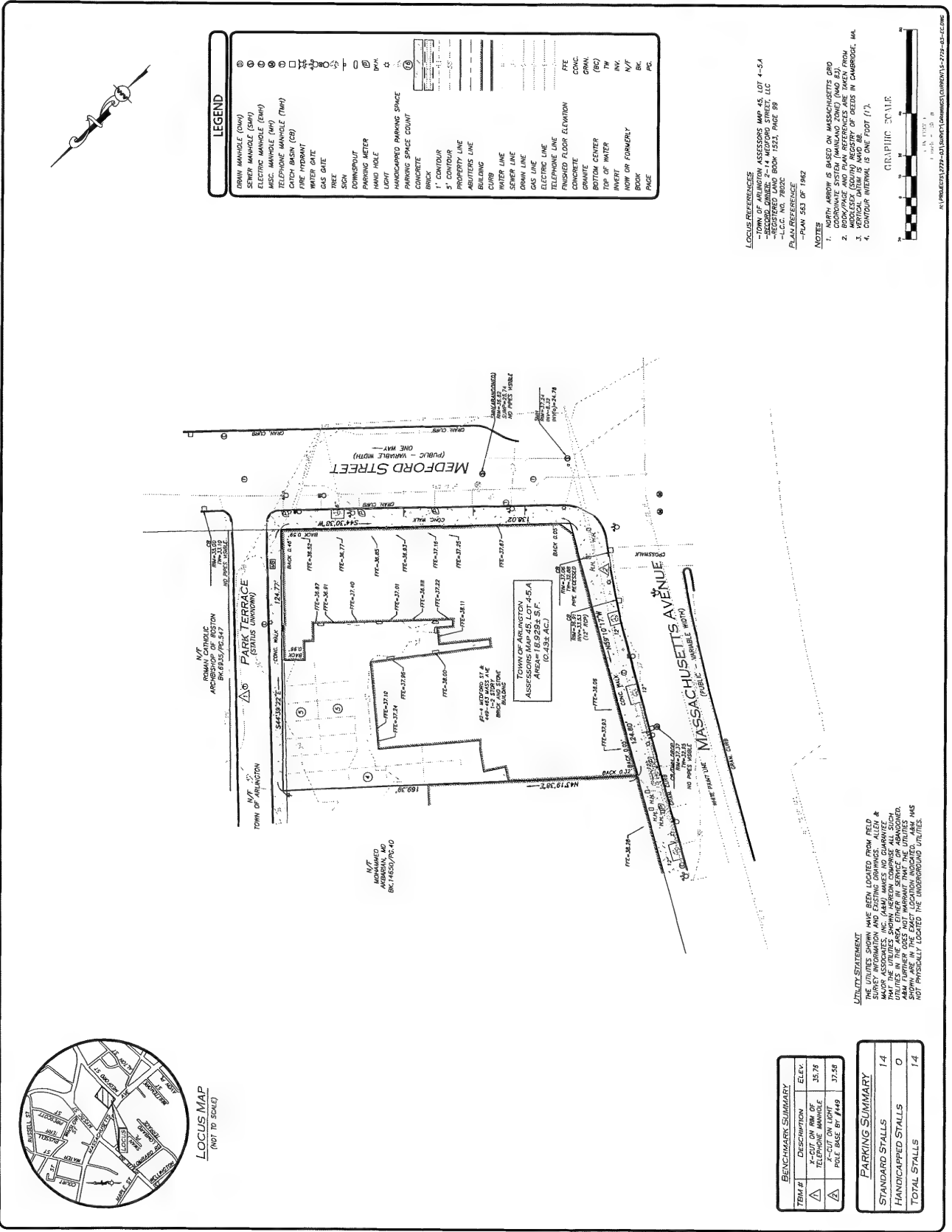
08/19/21

PROJECT NO. 22040 DATE 08/19/21
 SCALE 1"=20' DWG. NAME 2275045C
 DRAWN BY: AJP CHECKED BY: NE
 PROJECT 455-457
 MASSACHUSETTS
 AVENUE
 ARLINGTON, MA

ALLEN & MAJOR ASSOCIATES, INC.
 civil engineering & land surveying
 455-457 MASSACHUSETTS AVENUE
 ARLINGTON, MA 02474
 TEL: 617.353.4800
 FAX: 617.353.4800

MASSACHUSETTS
 214 MEDFORD STREET, L.C.
 455 MASSACHUSETTS AVENUE, SUITE 1
 ARLINGTON, MA 02474

EXISTING CONDITIONS
 SHEET NO. 1



LOCUS MAP
 (NOT TO SCALE)


BENCHMARK SUMMARY		
BM #	DESCRIPTION	ELEV.
1	3" CUT ON RM OF TELE. CUT ON EXPOSED POLE BASE BY #149	35.78

PARKING SUMMARY		
STANDARD STALLS	14	
HANDICAPPED STALLS	0	
TOTAL STALLS	14	

LOCUS REFERENCES
 -ASSESSORS MAP 45, LOT 4-5A
 -RECORD OF DEEDS, 2-14 MEDFORD STREET, LLC
 -RECORDED LAND BOOK 1521, PAGE 99
 -PLAN 353 OF 1982

NOTES
 1. NORTH ARROW IS BASED ON MASSACHUSETTS GRID
 2. COORDINATE SYSTEM (NAD83) (NAD 83)
 3. VERTICAL DATUM IS NAD 83
 4. CONTOUR INTERVAL IS ONE FOOT (1').


UTILITY STATEMENT
 THE AREA LOCATED FROM FIELD SURVEY HAS BEEN MAINTAINED BY MAJOR ASSOCIATES, INC. (MAI) MAKES NO GUARANTEE, AND MAI DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE ACCURATE. MAI HAS BEEN ADVISED THAT THE UTILITIES SHOWN ARE BASED ON RECORDS AND FIELD SURVEY. MAI HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

PROJECT:
455-457
MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. 2759-3 DATE: 8/20/2021
SCALE: AS SHOWN (SHEET NAME: C501)
DESIGNED BY: JG/AMM CHECKED BY: AM/PMI
DRAWN BY:



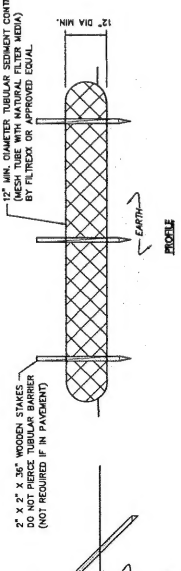
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering & land surveying
100 VANDERBILT AVENUE, SUITE 200
BOSTON, MA 02129
TEL: (617) 552-8800
FAX: (617) 552-8801
WWW.ALLENMAJOR.COM

DRAWING TITLE: DETAILS
SHEET NO.: C-501

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1

TUBULAR SEDIMENT BARRIER
NOT TO SCALE

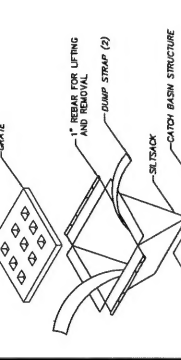


NOTES:

1. ALL MATERIALS TO MEET MANUFACTURER'S SPECIFICATIONS.
2. INSTALL WOODEN STAKES IN A CROSS-CROSS PATTERN EVERY 6' ON CENTER.
3. OVERLAP TUBULAR BARRIER SEGMENTS A MINIMUM OF 12".
4. THE CONTRACTOR SHALL MAINTAIN THE TUBULAR BARRIERS IN A FUNCTIONAL CONDITION AT ALL TIMES. THE BARRIERS SHALL BE ROUTINELY INSPECTED BY THE CONTRACTOR.
5. WHERE THE TUBULAR BARRIERS REQUIRE REPAIR OR SEDIMENT REMOVAL, IT WILL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST.
6. AT A MINIMUM, THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE WHEN THEY REACH 1/3 THE EXPOSED HEIGHT OF THE BARRIER.

2

SILTSTACK INLET DETAIL
NOT TO SCALE

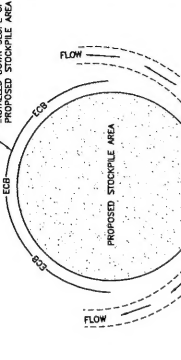


NOTES:

1. METAL SILTSTACK PER MANUFACTURER'S INSTRUCTIONS AND REMOVE SEDIMENT FROM SILTSTACK WHEN RESTRAINT CORD IS NO LONGER EFFECTIVE. REPLACE AS NEEDED.
2. DURING CONSTRUCTION OPERATIONS, THE POTENTIAL FOR SEDIMENT ACCUMULATION AT THE SILTSTACK BAINS EXIST.

3

STOCKPILE PROTECTION DETAIL
NOT TO SCALE

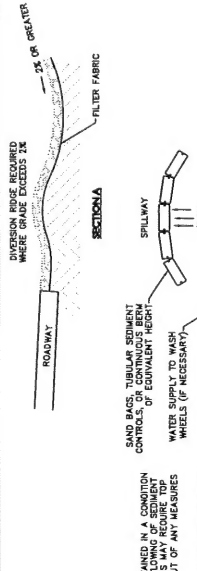


NOTES:

1. EROSION CONTROL BARRIER SHALL BE INSTALLED AROUND THE PROPOSED STOCKPILE AREA.
2. PROPOSED STOCKPILE AREA SHALL BE COVERED WITH STRAW AND MULCH AT 100LB/1,000 SQ. FT. OR MORE SHALL BE SEED WITH WINTER RYE (FOR FALL SEEDING AT 100LB/1,000 SQ. FT.) OR AN ANCHORED MULCH WITHIN 7 DAYS OF PRIOR TO ANY RAINFALL.

4

TEMPORARY CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE

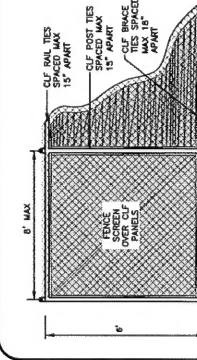


NOTES:

1. DIVERSION RIDGE REQUIRED WHERE GRADE EXCEEDS 2%.
2. DIVERSION RIDGE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF FLOWING OF SEDIMENT, DIRT, OR OTHER MATERIALS ONTO ADJACENT AREAS.
3. DIVERSION RIDGE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF FLOWING OF SEDIMENT, DIRT, OR OTHER MATERIALS ONTO ADJACENT AREAS.
4. DIVERSION RIDGE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF FLOWING OF SEDIMENT, DIRT, OR OTHER MATERIALS ONTO ADJACENT AREAS.
5. DIVERSION RIDGE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF FLOWING OF SEDIMENT, DIRT, OR OTHER MATERIALS ONTO ADJACENT AREAS.
6. DIVERSION RIDGE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF FLOWING OF SEDIMENT, DIRT, OR OTHER MATERIALS ONTO ADJACENT AREAS.

5

TEMPORARY CONSTRUCTION FENCE OF SCREEN
NOT TO SCALE

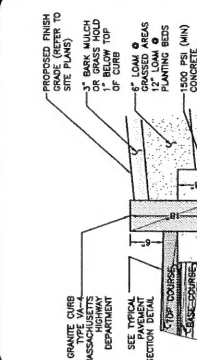


NOTES:

1. FENCE MATERIAL SHALL BE MADE FROM KNITTED HIGH DENSITY POLYETHYLENE WITH UV ADDITIVE.
2. SCREEN PLACEMENT SHALL BE A MINIMUM OF 100 LB/FT.
3. SCREEN SHALL BE GREEN OR BLACK.
4. SCREEN COLOR SHALL BE GREEN OR BLACK.
5. SCREEN COLOR SHALL BE GREEN OR BLACK.

6

VERTICAL GRANITE CURB
NOT TO SCALE

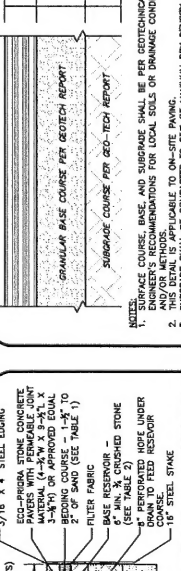


NOTES:

1. GRANITE CURB SHALL BE 12" HIGH AND 12" WIDE.
2. GRANITE CURB SHALL BE 12" HIGH AND 12" WIDE.
3. GRANITE CURB SHALL BE 12" HIGH AND 12" WIDE.
4. GRANITE CURB SHALL BE 12" HIGH AND 12" WIDE.
5. GRANITE CURB SHALL BE 12" HIGH AND 12" WIDE.

7

STANDARD DUTY BITUMINOUS PAVEMENT
NOT TO SCALE

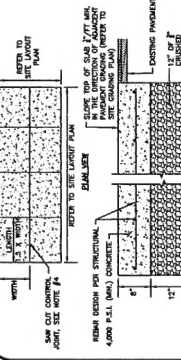


NOTES:

1. PAVEMENT COURSE BASE AND SUBGRADE SHALL BE PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS FOR LOCAL SOILS OR DRAINAGE CONDITIONS AND/OR METHODS.
2. SUBGRADE SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY (AS DETERMINED BY ASTM D1557).
3. COURSE PAVEMENT DETAIL WITH GEOTECHNICAL ENGINEER.
4. COURSE PAVEMENT DETAIL WITH GEOTECHNICAL ENGINEER.

8

PRECAST CONCRETE PAVEMENT (PREVIOUS)
NOT TO SCALE

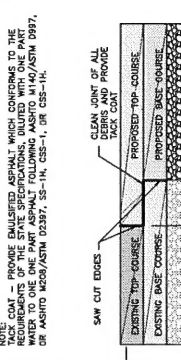


NOTES:

1. PRECAST CONCRETE PAVEMENT SHALL BE 12" THICK AND 12" WIDE.
2. PRECAST CONCRETE PAVEMENT SHALL BE 12" THICK AND 12" WIDE.
3. PRECAST CONCRETE PAVEMENT SHALL BE 12" THICK AND 12" WIDE.
4. PRECAST CONCRETE PAVEMENT SHALL BE 12" THICK AND 12" WIDE.
5. PRECAST CONCRETE PAVEMENT SHALL BE 12" THICK AND 12" WIDE.

9

HEAVY DUTY CONCRETE PAD
NOT TO SCALE

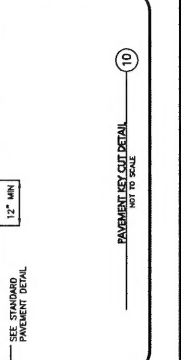


NOTES:

1. PROVIDE 12" MIN. THICKNESS FOR THE TOP SURFACE.
2. PROVIDE 12" MIN. THICKNESS FOR THE TOP SURFACE.
3. PROVIDE 12" MIN. THICKNESS FOR THE TOP SURFACE.
4. PROVIDE 12" MIN. THICKNESS FOR THE TOP SURFACE.
5. PROVIDE 12" MIN. THICKNESS FOR THE TOP SURFACE.

10

PAVEMENT NEW CUT DETAIL
NOT TO SCALE

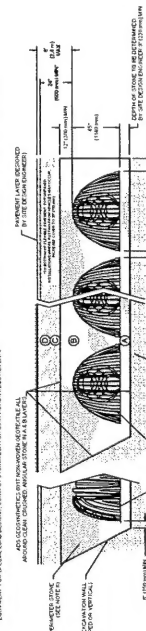


NOTES:

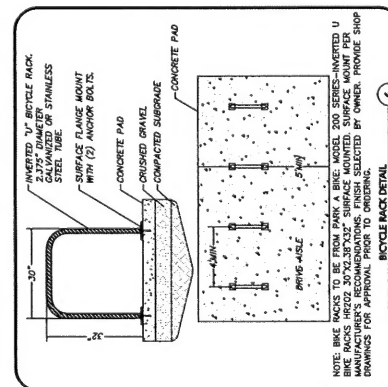
1. PAVEMENT NEW CUT DETAIL SHALL BE 12" THICK AND 12" WIDE.
2. PAVEMENT NEW CUT DETAIL SHALL BE 12" THICK AND 12" WIDE.
3. PAVEMENT NEW CUT DETAIL SHALL BE 12" THICK AND 12" WIDE.
4. PAVEMENT NEW CUT DETAIL SHALL BE 12" THICK AND 12" WIDE.
5. PAVEMENT NEW CUT DETAIL SHALL BE 12" THICK AND 12" WIDE.

1. CHAMBERS SHALL BE MANUFACTURED FROM NEW POLYPROPYLENE OR POLYETHYLENE RESINS TESTED USING ASTM STANDARDS.
2. CHAMBERS SHALL BE MANUFACTURED FROM NEW POLYPROPYLENE OR POLYETHYLENE RESINS TESTED USING ASTM STANDARDS.
3. CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM T2797, STANDARD SPECIFICATION FOR STRUCTURAL STITCHES OF THERMOPLASTIC CHAMBERS USED FOR CONCRETE CONCRETE CHAMBERS.
4. CHAMBERS SHALL HAVE UNIFORM, UNINTERRUPTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS.
5. ONLY CHAMBERS THAT ARE APPROVED BY THE ENGINEER WILL BE ALLOWED.
6. CHAMBERS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
7. THE MATERIALS OF CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST INSTALLATION INSTRUCTIONS.

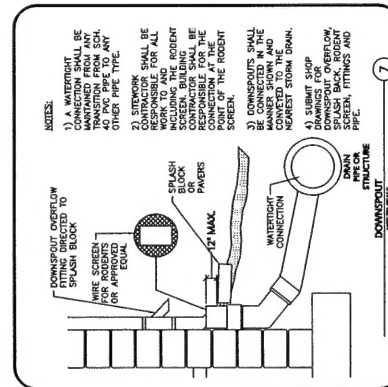
	MATERIAL LOCATION	DESCRIPTION	ASBTO MATERIAL CATEGORIES	COMPACTION/DENSITY REQUIREMENT
D	UNDER THE DRIVEWAY AND UNDER THE DRIVEWAY DRIVE	ALL ASPHALT DRIVEWAYS, DRIVEWAYS, AND DRIVEWAY DRIVEWAYS SHALL BE COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY OF THE MATERIAL.	NA	PERFORM THE COMPACTION TESTS AND REPORT THE RESULTS TO THE ENGINEER.
C	UNDER THE DRIVEWAY AND UNDER THE DRIVEWAY DRIVE	ALL ASPHALT DRIVEWAYS, DRIVEWAYS, AND DRIVEWAY DRIVEWAYS SHALL BE COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY OF THE MATERIAL.	AS 100-200	PERFORM THE COMPACTION TESTS AND REPORT THE RESULTS TO THE ENGINEER.
B	UNDER THE DRIVEWAY AND UNDER THE DRIVEWAY DRIVE	ALL ASPHALT DRIVEWAYS, DRIVEWAYS, AND DRIVEWAY DRIVEWAYS SHALL BE COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY OF THE MATERIAL.	AS 100-200	PERFORM THE COMPACTION TESTS AND REPORT THE RESULTS TO THE ENGINEER.
A	UNDER THE DRIVEWAY AND UNDER THE DRIVEWAY DRIVE	ALL ASPHALT DRIVEWAYS, DRIVEWAYS, AND DRIVEWAY DRIVEWAYS SHALL BE COMPACTED TO 98% OF THE MAXIMUM DRY DENSITY OF THE MATERIAL.	AS 100-200	PERFORM THE COMPACTION TESTS AND REPORT THE RESULTS TO THE ENGINEER.

[illegible]

NOT TO SCALE

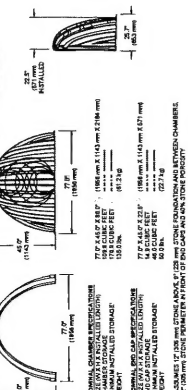


NOTE: BIKE RACKS TO BE FROM PARK A BIKE: MODEL 200 SERIES-INVERTED U BIKE RACKS HR202 30"x2.58"x32" SURFACE MOUNTED. SURFACE MOUNT PER MANUFACTURER'S RECOMMENDATIONS. FINISH SELECTED BY OWNER. PROVIDE SHOP DRAWINGS FOR APPROVAL PRIOR TO ORDERING.



NOT TO SCALE

1

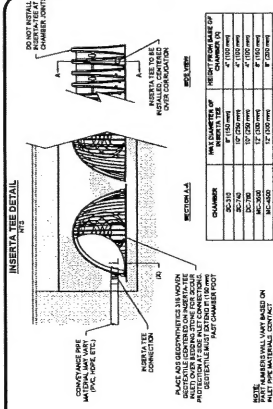


ING AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
AND AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

[illegible]

NOTE: ALL DIMENSIONS ARE NOMINAL.

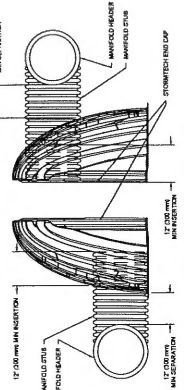
NOT TO SCALE



SECTION A		SECTION B	
<p>PLACE AOS RECONSTRUCTED 2x8 WOODEN JOIST OVER EXISTING 2x8 JOIST. BRIDGE PLATE OVER EXISTING STONE FOR JOIST CONNECTION. JOIST TO BE 12" ON CENTER. JOIST MUST EXTEND 12" BEYOND FAULT CONTRACT FOOT.</p>		<p>REPLACE EXISTING CHAMBER IN PLACE WITH NEW CHAMBER IN PLACE. CHAMBER TO BE 12" ON CENTER. CHAMBER MUST EXTEND 12" BEYOND FAULT CONTRACT FOOT.</p>	
CHAMBER	FAULT CONTRACT FOOT	CHAMBER	FAULT CONTRACT FOOT
SC-110	12" (1200 mm)	SC-110	12" (1200 mm)
SC-140	14" (1400 mm)	SC-140	14" (1400 mm)
SC-170	17" (1700 mm)	SC-170	17" (1700 mm)
SC-200	20" (2000 mm)	SC-200	20" (2000 mm)
SC-230	23" (2300 mm)	SC-230	23" (2300 mm)
SC-260	26" (2600 mm)	SC-260	26" (2600 mm)
SC-290	29" (2900 mm)	SC-290	29" (2900 mm)
SC-320	32" (3200 mm)	SC-320	32" (3200 mm)
SC-350	35" (3500 mm)	SC-350	35" (3500 mm)
SC-380	38" (3800 mm)	SC-380	38" (3800 mm)
SC-410	41" (4100 mm)	SC-410	41" (4100 mm)
SC-440	44" (4400 mm)	SC-440	44" (4400 mm)
SC-470	47" (4700 mm)	SC-470	47" (4700 mm)
SC-500	50" (5000 mm)	SC-500	50" (5000 mm)
SC-530	53" (5300 mm)	SC-530	53" (5300 mm)
SC-560	56" (5600 mm)	SC-560	56" (5600 mm)
SC-590	59" (5900 mm)	SC-590	59" (5900 mm)
SC-620	62" (6200 mm)	SC-620	62" (6200 mm)
SC-650	65" (6500 mm)	SC-650	65" (6500 mm)
SC-680	68" (6800 mm)	SC-680	68" (6800 mm)
SC-710	71" (7100 mm)	SC-710	71" (7100 mm)
SC-740	74" (7400 mm)	SC-740	74" (7400 mm)
SC-770	77" (7700 mm)	SC-770	77" (7700 mm)
SC-800	80" (8000 mm)	SC-800	80" (8000 mm)
SC-830	83" (8300 mm)	SC-830	83" (8300 mm)
SC-860	86" (8600 mm)	SC-860	86" (8600 mm)
SC-890	89" (8900 mm)	SC-890	89" (8900 mm)
SC-920	92" (9200 mm)	SC-920	92" (9200 mm)
SC-950	95" (9500 mm)	SC-950	95" (9500 mm)
SC-980	98" (9800 mm)	SC-980	98" (9800 mm)
SC-1010	101" (10100 mm)	SC-1010	101" (10100 mm)
SC-1040	104" (10400 mm)	SC-1040	104" (10400 mm)
SC-1070	107" (10700 mm)	SC-1070	107" (10700 mm)
SC-1100	110" (11000 mm)	SC-1100	110" (11000 mm)
SC-1130	113" (11300 mm)	SC-1130	113" (11300 mm)
SC-1160	116" (11600 mm)	SC-1160	116" (11600 mm)
SC-1190	119" (11900 mm)	SC-1190	119" (11900 mm)
SC-1220	122" (12200 mm)	SC-1220	122" (12200 mm)
SC-1250	125" (12500 mm)	SC-1250	125" (12500 mm)
SC-1280	128" (12800 mm)	SC-1280	128" (12800 mm)
SC-1310	131" (13100 mm)	SC-1310	131" (13100 mm)
SC-1340	134" (13400 mm)	SC-1340	134" (13400 mm)
SC-1370	137" (13700 mm)	SC-1370	137" (13700 mm)
SC-1400	140" (14000 mm)	SC-1400	140" (14000 mm)
SC-1430	143" (14300 mm)	SC-1430	143" (14300 mm)
SC-1460	146" (14600 mm)	SC-1460	146" (14600 mm)
SC-1490	149" (14900 mm)	SC-1490	149" (14900 mm)
SC-1520	152" (15200 mm)	SC-1520	152" (15200 mm)
SC-1550	155" (15500 mm)	SC-1550	155" (15500 mm)
SC-1580	158" (15800 mm)	SC-1580	158" (15800 mm)
SC-1610	161" (16100 mm)	SC-1610	161" (16100 mm)
SC-1640	164" (16400 mm)	SC-1640	164" (16400 mm)
SC-1670	167" (16700 mm)	SC-1670	167" (16700 mm)
SC-1700	170" (17000 mm)	SC-1700	170" (17000 mm)
SC-1730	173" (17300 mm)	SC-1730	173" (17300 mm)
SC-1760	176" (17600 mm)	SC-1760	176" (17600 mm)
SC-1790	179" (17900 mm)	SC-1790	179" (17900 mm)
SC-1820	182" (18200 mm)	SC-1820	182" (18200 mm)
SC-1850	185" (18500 mm)	SC-1850	185" (18500 mm)
SC-1880	188" (18800 mm)	SC-1880	188" (18800 mm)
SC-1910	191" (19100 mm)	SC-1910	191" (19100 mm)
SC-1940	194" (19400 mm)	SC-1940	194" (19400 mm)
SC-1970	197" (19700 mm)	SC-1970	197" (19700 mm)
SC-2000	200" (20000 mm)	SC-2000	200" (20000 mm)
SC-2030	203" (20300 mm)	SC-2030	203" (20300 mm)
SC-2060	206" (20600 mm)	SC-2060	206" (20600 mm)
SC-20			

NOT TO SCALE

MC-SERIES END CAP INSERTION DETAIL



NOTE: MANIFOLD STUBS MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

Figure 1. The study area.

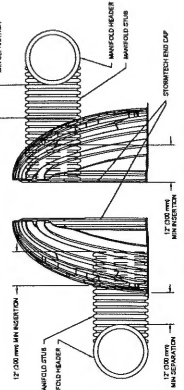
1. CHAMBERS SHALL BE MANUFACTURED FROM NEW POLYPROPYLENE OR POLYETHYLENE RESINS TESTED USING ASTM STANDARDS.
2. CHAMBERS SHALL BE MANUFACTURED FROM NEW POLYPROPYLENE OR POLYETHYLENE RESINS TESTED USING ASTM STANDARDS.
3. CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM T1979, STANDARD SPECIFICATION FOR STRUCTURAL STITCHES OF THERMOPLASTIC COMPOSITES FOR CONCRETE REINFORCEMENT CHAMBERS.
4. CHAMBERS SHALL HAVE UNIFORM, UNINTERRUPTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS.
5. ONLY CHAMBERS THAT ARE APPROVED BY THE ENGINEER WILL BE ALLOWED.
6. CHAMBERS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
7. ALL DESIGN SPECIFICATIONS FOR CHAMBERS SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE CHAMBERS MANUFACTURER'S LATEST INSTRUCTIONS.



NOT TO SCALE

NOT TO SCALE

MC-SERIES END CAP INSERTION DETAIL



NOTE: MANIFOLD STUBS MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

Figure 1. The study area.



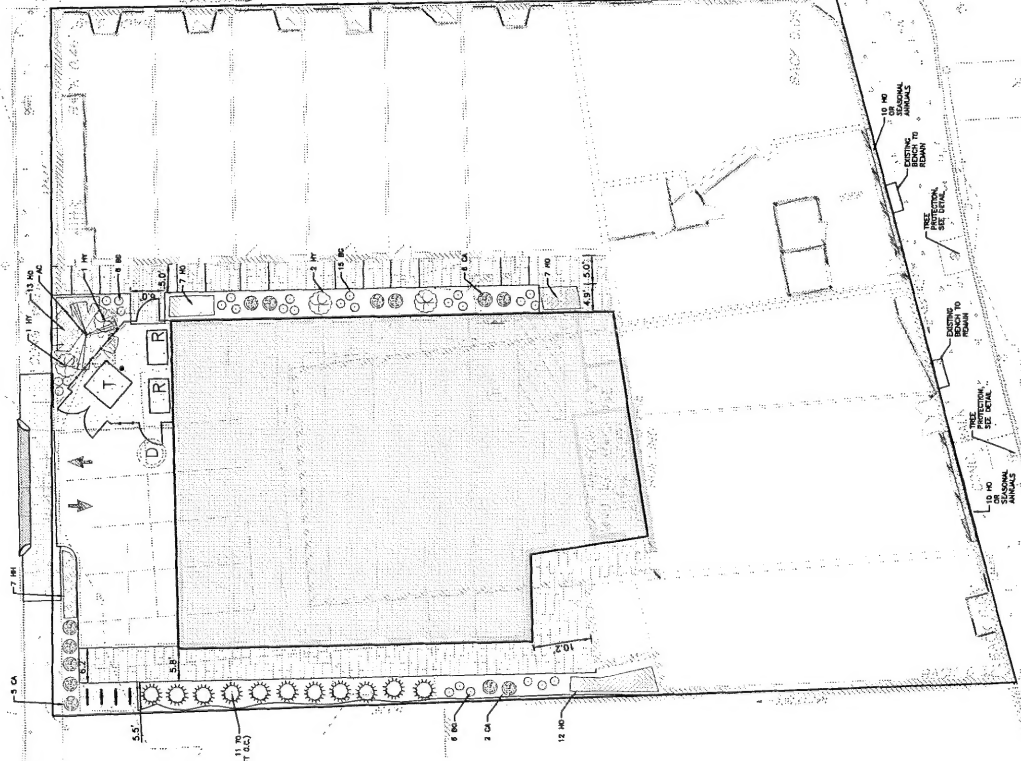
DIG SAFE



**BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233**

4/7
ROMAN CATHOLIC
ARCHDIOCESE OF BOSTON
BX 6328/MS 547

PARK TERRACE
(STATUS UNKNOWN)



PLANTING SCHEDULE-TREES, SHRUBS, GROUNDCOVERS & PERENNIALS

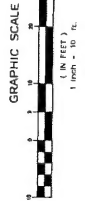
KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	MIN. SIZE	SPACING	COMMENTS
EVERGREEN TREES						
TD	11	JALPA C. 'WINTERGREEN'	WINTERGREEN ARBORVITAE	6-7' HT	AS SHOWN	B&B
FLOWERING TREES						
AC	1	MELANCHOLY CANDIDIS	SHADELOW SERVICEBERRY	2.5-3' CAL.	AS SHOWN	B&B
SHRUBS/PERENNIALS						
CA	13	CORNUS ALBA 'NORT' HAU'	PORRY HALO DOGWOOD	#3	AS SHOWN	POT
BG	27	ERUUS 'GREEN MOUNTAIN'	GREEN MOUNTAIN DOGWOOD	#2	AS SHOWN	POT
HY	4	HYDRANGEA 'ABROGEEDEUS'	INFEREDBALL 'HYDRANGEA'	#5	AS SHOWN	POT
HO	48	HOSTA 'LUNE'	HOSTA HOSTA	#1	24" O.C.	SHAGGED
HM	7	HEMEROCALLIS 'BIG TIME HAPPY'	BIG TIME HAPPY DAYLILLY	#1	24" O.C.	SHAGGED

LEGEND


- DECIDUOUS TREE
- EVERGREEN TREE
- FLOWERING TREE
- SHRUBS
- MULCH BED
- PERENNIALS/PROGNOSIS



- [illegible]



GRAPHIC SCALE



(IN FEET)
1 inch = 10 ft.



REGISTERED LANDSCAPE ARCHITECT FOR
ALLEN & MAJOR ASSOCIATES, INC.

9.24.21
Baker, R.

NO.	DATE	DESCRIPTION
LOCANT/OWNER:		
		2-14 MEDFORD STREET, LLC 455 MASSACHUSETTS AVE, STE 1 ARLINGTON, MA 02474

455-457
MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO.	2729-03	DATE	6/20/2021
SCALE	1" = 10'	DWG. NAME	C7729-03
DESIGNED BY:	KJ, BOD	CHECKED BY:	ARM/NOJ

ALGEMENE



**ALLEN & MAJOR
ASSOCIATES, INC.**

civil engineering • land surveying
environmental consulting • landscape architecture
new alliance for com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 903-6880
FAX: (781) 933-8896

[illegible]

1

